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AVAILABILITY AND QUALITY OF AGRICULTURAL DATA FOR THE NEW LANDS IN EGYPT

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LIST OF ACRONYMS

APRP	Agricultural Policy Reform Program
APS	Animal Production Sector
CAAE	Central Administration for Agricultural Economics
CAH	Central Administration for Horticulture
CAPMAS	Central Agency for Public Mobilization and Statistics
EAS	Economic Affairs Sector of MALR
ERR	Economic Rates of Return
ERSAP	Economic Reform and Structural Adjustment Program
ESA	Egyptian Survey Authority
GARPAD	General Authority for Reclamation Projects and Agricultural Development
GDAC	General Directorate for Agriculture Census
GDAS	General Directorate for Agriculture Statistics
GDS	General Directorate for Sampling
GOVS	General Organization of Veterinary Services
IMF	International Monetary Fund
MALR	Ministry of Agriculture & Land Reclamation
MPWWR	Ministry of Public Works and Water Resources
MVE	Monitoring, Verification, and Evaluation Unit
MWRI	Ministry of Water Resources and Irrigation
NARP	National Agriculture Research Project
NLDS	New Lands Development Study
PBDAC	Principal Bank for Development and Agricultural Credit
RDI	Reform Design and Implementation Unit
RRRS	Rapid Rural Reconnaissance Survey
USAID	United States Agency for International Development

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EXECUTIVE SUMMARY

The purpose of this study is to examine the types, quality and completeness of data now being collected on the New Lands, and make recommendations on how to improve the Ministry of Agriculture and Land Reclamation (MALR) data collection system as it pertains to New Lands. This study follows a similar study concerning the availability and quality of agricultural data relating to the Nile valley governorates by the MVE unit of APRP (See Morsy F., 1999). The basic conclusion of that study was that relatively complete and good data on Nile valley farms are available at the village and cooperative level, and a sampling system directed at them should provide reliable data for policy analysis.

Over the past 50 years Egypt has added around 1.5 million feddans to its cultivated area from the approximately 2.7 million feddans of land that it reclaimed in the Nile Delta or developed in the desert. This represents about 20% of current cultivated area. As more land is reclaimed and developed, questions persist as to whether expansion or providing more services to existing cultivated areas is the best approach to agricultural development in Egypt. In addition, the impact of APRP reforms on the New Lands and Old Lands may be different.

To perform the analysis of development and impact issues related to the New Lands requires good quality data on agricultural production and inputs particular to those lands. Separate data are required because the New Lands are quite different from the Old Lands: coarse, sandy soils versus more fertile, heavier to loamy soils in the Delta, different irrigation systems and water sources, fewer services and poorer access to markets, farmers who have less experience in managing these types of soils, and many other differences that affect what is an appropriate crop mix or production technology.

The basic conclusion of this study is that current data on New Lands are biased and very incomplete. They are biased because they are incomplete and also because they are not collected using statistical sampling. The data cover almost no squatters; the data also do not cover a substantial portion of large and small investors, perhaps the most productive farms. Relatively little of the New Lands are covered by cooperatives, villages or the existing administrative statistics system. Reliable data for policy analysis will have to be collected via primary sample surveys devoting a lot of time to preparation of an appropriate sample frame, at least until the MALR system for collecting data on New Lands can be expanded and strengthened or redesigned.

To conduct this study, the study team interviewed farmers, extension agents, cooperative leaders, district level and regional statisticians, horticulture and livestock officers, and governorate sampling directors in five regions: Fayoum, New Valley, Noubaria, Ismailia and North Sinai. Also, heads of the various sectors and central administrations in MALR concerned with data collection and reporting were interviewed. The team also examined the available statistical reports, published and unpublished data, the agricultural census, and any report available on the New Lands.

At the present time there is no complete system for collecting data on the New Lands. Within the existing system, some of the methods used for collecting data on the New Lands are the same as for the Old Lands, and some are different. MALR collects current agricultural statistics on the Old Lands

by means of two parallel systems. One is based on upward reporting of extension agents concerning the farmers under their jurisdiction. Coverage of extension agents in the New Lands, however, is quite limited. The second system for the Old Lands provides supposedly independent estimates of crop area by the Egyptian Survey Authority and objective yields for some important crops obtained by the Directorate of Sampling. Neither of these two services gather much data in the New Lands. For the New Lands the third method used is based on the upward reporting of the Graduate Project Supervisories regarding the farmers under their supervision. This method provides MALR a substantial amount of data, and as a result, the data reported for the New Lands tend to be mostly the data for these project areas.

The team found data on New Lands, as published by the Economic Affairs Sector, to be incomplete, of poor quality, and poorly presented. Apart from the out-of-valley directorates of New Valley, Matruh, Red Sea, North and South Sinai and Noubaria, data reported for the New Lands include only data covering the Mubarak Graduates Project, which accounts for only 25% of land reclaimed since 1988. Reclaimed areas in Nile Valley governorates are classified as old land or are not counted at all.

The incomplete coverage of area, poor quality and poor presentation of available data in official statistics on the New Lands arises from a combination of the following problems and constraints:

- An unwieldy and imprecise definition of New Lands and its inconsistent application;
- Poor coordination at the governorate level between the various entities responsible for reclaiming, developing, serving and reporting on the New Lands;
- Relatively recent expansion of cultivated area into lands not previously settled and some of which are not covered by any administrative structure;
- The administrative structure as it pertains to agriculture was not updated as these New Lands have been reclaimed;
- The Mubarak Graduates Project, one of the largest recipients of reclaimed land, maintains an independent reporting system for agricultural statistics on its participants, not integrated or coordinated with the administrative statistics structure covering the rest of each governorate;
- Inadequate resources and training for covering remote areas, large investors and squatters, who are dispersed and sometimes difficult to identify or access;
- A poor incentive structure within MALR for encouraging its agents to provide good quality data;
- Reliance on guesstimates and adjustments by persons not familiar with the area covered by the data;
- Shifting presentation formats both in the same volume and over time that make comparisons unwieldy, difficult or impossible.

In terms of the data that are actually reported, coverage is best for horticultural crops grown by participants of the Mubarak Young Graduates Project, but the quality of those data is not known. There was no access to data as they are reported up the chain in order to make this determination. There are no horticultural data reported separately for any other New Land areas. It is important to note that the statistical reports do not point out that the published data are only those for the Graduates, which cover no more than 25% of recently reclaimed area. This gives the impression that the data are more

complete than they are. This type of misleading reporting is not uncommon in available data for the New Lands.

Although the Mubarak Graduates Project appears to provide good coverage of graduates and beneficiaries, all of whom fall under its jurisdiction, it has only limited data on small investors because it has responsibility only for some of them. GARPAD also allocates reclaimed land to small investors not supervised by the Graduates Project, and to large investors, all of whom fall under the supervision of the MALR extension service. In addition, squatters settle unallocated land in the hands of the public sector, unsupervised by anyone. MALR provides no current statistics for any of these groups, even though such data would be of tremendous use for policy analysis purposes.

Two opportunities are now available for correcting these problems. The year 2000 agricultural census is now underway. For the first time it will create census reporting clusters that separate new and old lands and make it easier to adopt a definition of New Lands that is more suited to policy analysis. Summary analysis and publication of key stratification variables for each of the reporting clusters by the Economic Affairs Sector (EAS) could provide an excellent sample frame for a sampling approach to gathering data on the New Lands. Therefore, the census, through its sample frame, should provide the vehicle to complete coverage that is lacking in the current New Lands data. This could occur much more quickly and much more cheaply than expanding the existing administrative statistics program to provide better coverage of the New Lands.

The second opportunity is a recent change in administrative structure and leadership of the Economic Affairs Sector. This appears to have presented an opportunity for expanding the responsibility of the Sampling Directorate to include collecting area and cost of production information for the New Lands, in addition to providing more complete coverage for objective yield estimates in these areas as well.

Recommendations

1. EAS should take ***immediate action*** to ensure that data being collected by the agricultural census includes information on class of holder (graduates, beneficiaries, investor, and squatter) and time since reclamation for the holding. This information is critical for developing a stratified sampling frame for future primary studies on production technologies in the New Lands, and for using current statistics to monitor the progress of reclamation and resettlement efforts. A special effort is required to include data on squatters.

2. EAS should develop a comprehensive, nationwide sampling frame based on the census reporting clusters used in the agricultural census. It should include selected critical information necessary for stratifying each reporting cluster according to a number of likely criteria.

3. As soon as the sample frame permits, MALR should adopt a definition of New Lands that is more focused on lands actually reclaimed as New Lands rather than on the administrative location of the land. This process can be facilitated by grouping reclaimed lands in each governorate into clusters that can be reported on separately, prior to aggregation for the district or governorate. The agriculture

census reporting clusters and the GARPAD project development areas are two sources of information necessary to do this.

4. MALR should activate the national level New Lands Data Coordinating Committee established by an existing ministerial decree, and make sure it includes the governorate agricultural affairs officers. Their administrative status as undersecretaries makes it mandatory that they participate in the national committee. A parallel committee should also be activated at the governorate level, which should also include the agricultural affairs officer for the governorate. The purpose of these committees is to ensure that all New Land areas are fully covered by the administrative statistics on New Lands, and that the data are available and reported at the governorate level by the governorate itself. The committees will ensure that data on the Graduates Project is also reported in this way directly to the individual governorates. The national coordinating committee should have an executive secretary whose task will be to assist the governorate committees in identifying, classifying and clustering New Lands in the governorate for reporting purposes.

5. EAS should expand the duties of the Sampling Directorate to include collection of yield, area and production cost data on crops important to the New Lands. Initially this effort should be directed at those New Land areas which are not now being fully covered by anyone. Eventually this effort should be expanded to include all New Lands and, ultimately, the Nile valley as well.

6. EAS should require the Mubarak Project to report its area and production data to each governorate directly, by season. For those Graduate Project areas falling in more than one governorate, the data collection and coordinating committee that was recommended at that level can work with the Mubarak Supervisories to allocate area and production between the governorates concerned so as to avoid double counting.

7. The statistical reports of the EAS should either report data on graduates as a separate category at the bottom of the tables, or expand the reporting and coverage of New Lands inside of the old valley so that the coverage of the data are clear to the user. The reports should also contain a discussion of reporting period, aggregation procedures and missing or incomplete data. It should adopt a convention for alerting the reader that data are missing or incomplete and not zero.

8. The EAS should engage in a structured program for upgrading the training of all personnel involved in data collection and analysis relating to the New Lands. This training should be targeted at the specific sample frame, sampling, measurement and implementation issues the Ministry decides to adopt for collecting data on the New Lands.

1. INTRODUCTION

There is great interest in Egypt in knowing more about what is happening in the New Lands and in the results of the very large investments that are being made each year in their development. Many see their development as a promising source of employment for redundant labor that can also increase the country's food security and contribute to agricultural growth. Others question whether future efforts should focus on continued reclamation of new land or on providing infrastructure and supporting services for those lands already reclaimed. While the debate continues, more new lands are being reclaimed, even as some of the land already reclaimed remains unused, or simply poorly used. The Ministry of Agriculture and Land Reclamation (MALR) recognizes that it needs better data on the New Lands in order to inform this debate.

1.1 Objectives

The objective of this study is to assess the availability, completeness and quality of agricultural data now being collected on the New Lands in Egypt, and make recommendations on how to improve the MALR data collection system as it pertains to New Lands. As part of this assessment the study reviews various definitions of New Lands, and assembles, as much as possible within the constraints of the study, a bibliography of information currently available on the New Lands are included in Annex A.

1.2 Justification

The United States Agency for International Development (USAID) is supporting agricultural policy reform in Egypt through its Agricultural Policy Reform Program (APRP). The APRP is jointly financed by the Government of Egypt, through the Ministry of Agriculture and Land Reclamation (MALR), and by USAID. The APRP includes a Monitoring, Verification and Evaluation (MVE) unit for monitoring, verifying and evaluating reforms promoted under the project. The MVE unit needs both current and historical data on the New Lands for assessing the impact of policy reforms undertaken under the project. This study follows a similar study of data availability and data quality directed at Nile valley governorates carried out last year.

1.2.1 MVE Impact Assessment

The APRP has been influential in guiding the Government of Egypt in its policy reforms, and helping it to maintain the momentum of reforms relating to Egypt's agricultural sector. Such policy reforms have been more or less ongoing since the late 1980's when Egypt began liberalizing agricultural markets by reducing the role of the public sector as an executing agent in services and transactions relating to agriculture. Since that time there has been increasing reliance on the private sector and institutional changes designed to foster more competitive markets as the primary drivers of agricultural development in Egypt. APRP reforms have been adopted with the expectation that they would foster this process and, as a result, improve the income and welfare of Egyptian farmers in the short run, and Egyptian consumers in the long run.

The MVE unit is responsible for monitoring and verifying the attainment of benchmarks accepted by all parties as valid indicators of progress of APRP, and for assessing the ultimate impact of the overall program. To do this it needs data, both baseline and current. Some data on the New Lands are available from the MALR and independent studies. The MVE wants to know what these are and how reliable they are for evaluation purposes.

1.2.2 Companion to Previous Study of the Nile Valley Lands

This study follows a similar study concerning the availability and quality of agricultural data relating to Nile valley governorates recently completed by the MVE unit (Morsy et al., 1999). Using a similar methodology as this study, that study concluded that relatively complete and good data on Nile valley farms are available at the village and cooperative level, where extension agents collect area and production for the major crops. Because the Nile valley is completely covered by cooperatives and extension agents, the population of farmers in the valley is also completely covered, at least in theory, and according to the study, mostly in practice. The MVE study documented that the data acquire an upward bias as they move up the reporting chain. However, there is no attempt to "change" the data at the level of the village and cooperative. Consequently, a sampling system directed at the coops and villages should provide reasonably reliable, unbiased data for most kinds of policy analysis relating to the Nile Valley.

In recent years MALR has requested the governorates, the highest level administrative unit outside of Cairo, to report separate data for New Lands and valley land (sometimes referred to as old lands or the old valley). This arises from a recognition that the New Lands are quite different from valley lands. Separate data will facilitate planning and policy analyses directed at these special areas.

The current study makes two additions to the previous study. The team draws a sharper contrast between the administrative systems for collecting agricultural data now in place, and sampling approaches. The sampling approach can provide data that is much more reliable and suitable for the kind of analysis that is needed to evaluate production technologies and production costs in the New Lands. It can do this at a much lower cost than the administrative approach.

More attention was paid to the roles of GARPAD and the Mubarak Young Graduates Project which are so important in the New Lands. The General Authority for Reclamation Projects and Agricultural Development (GARPAD), has roots back as far as 1950. GARPAD is responsible for reclaiming new lands once the water availability and soil studies are completed by the Ministry of Water Resources and Irrigation (MWRI), Previously the Ministry of Public Works and Water Resources (MPWWR). The Graduates Project settles new graduates and social beneficiaries on lands reclaimed under the supervision of GARPAD.

1.3 Why The New Lands Are Unique

New Lands as a group differ from land in the valley in several respects. The soils are much sandier than in the valley, making it much more important to manage soil fertility, fertilizer application, soil moisture holding capacity and soil conditioning in order to obtain economic yields. Water is less available,

making it necessary to adopt, at least from the point of view of the farmer, more expensive irrigation technologies. This, in turn forces farmers to concentrate on high value crops in order to cover those higher costs.

The New Lands are, in general, more distant from markets, while supporting services of all types, including research, extension, credit, and input services, are generally less available than in Nile valley governorates. Moreover, salinity is frequently a problem, limiting crop selection more so than in the valley. Markets for livestock products are often distant, reducing incentives to raise livestock, in spite of the much increased need for manure to build organic matter and cation exchange capacity in the coarse soils usually found there. On the other hand, the well aerated sandy soils seem to favor many horticultural crops; and the more costly drip and sprinkler irrigation systems produce higher yields than furrow (surface) irrigation for many horticultural crops, other things being equal.

Current New Land users can be subdivided into five major groups: graduates, beneficiaries, small investors, large investors and squatters. Smallholders were important in the past when government allocated reclaimed land to landless laborers and small farmers without providing resettlement support. Today, most non-investor holders receive some type of resettlement support.

Graduates are encouraged by government to settle and invest in new lands and are given major support through the Mubarak Young Graduates Project of MALR for that purpose. The support includes preparation of secondary and tertiary canals, resettlement support and long-term financing to purchase their land over a thirty year period.

Beneficiaries are individuals that the government wishes to aid in a special way by subsidizing their acquisition of agricultural land, invariably in newly reclaimed areas. This group includes landless laborers, persons displaced from state farms that have been dismantled, veterans and other similar groups. Both graduates and beneficiaries receive settlement and operational support from the Graduates Project. They hold approximately 30% of the total area of new lands reclaimed since 1987.

Small investors are individuals who purchase plots of land in the newly reclaimed areas, usually about 20 feddans, directly from the government. In some areas those with less than seven feddans also receive support from the Graduates Project, but this does not appear to be uniformly true.

Large investors are major stakeholders in policy decisions relating to production, cropping and marketing, due to their ownership of large areas of new lands. There is no official dividing line between large and small investors, but many observers use 20-30 feddans. There is also a group with more than 200 feddans that can be characterized as competitive entrepreneurs who are able to mitigate risk and bear interim losses on their own. They usually provide for themselves more of the basic irrigation infrastructure, such as wells, secondary and tertiary canals and roads, pumping facilities and system maintenance, unlike most graduates, beneficiaries and small investors. They frequently provide their own marketing and processing infrastructure as well. The term infrastructure is used differently than for graduates and beneficiaries, for whom it may also include housing, electricity, financing, schools and other social amenities.

Squatters are a group that is not discussed much, but which appears to be quite substantial in numbers and area cultivated. They simply occupy land that appears suitable and dig wells or pump lift water from nearby canals; eventually their property rights are recognized and they can get title to the land for a relatively modest payment if it is owned by the government. Estimates of the size of this group vary widely, but squatters could occupy as much as 15% of lands reclaimed since 1982.

Graduates, beneficiaries and small investors generally face obstacles such as lack of extension support, limited information on technology and both local and external markets, and the financing required to overcome these obstacles. Due to these limitations small holders and graduates tend to diversify production. Such diversification keeps them from achieving a level of technological and managerial sophistication that could increase yield and profits by exploiting system-wide efficiencies associated with specialization and geographic concentration. Although the profile of small holders in the New Lands is distinct from the graduates and beneficiaries, the limitations they encounter in the production process are quite similar to those faced by small holders in the Old Lands.

Although there is a tendency to diversify production in order to mitigate risks, farmers in the New Lands are in general controlled by the climate, availability of water, soil type and other soil characteristics found there. Because of these factors, and other economic factors one observes a clear trend towards increased production of horticultural crops. Furthermore, irrigation techniques commonly employed in those areas – such as drip and sprinkler irrigation are more suitable for the scarce water resources and the sandy and calcareous soils typical of the New Lands.

All of these factors have a definite impact on cropping decisions. In order to produce and compete effectively in the market, substantial investments are needed in maintenance, land management, marketing information, and irrigation systems. Without such investments, small holders are likely to continue planting low value field crops instead of more expensive crops that can be competitive in the international market. This reduces their incentive to remain on the land.

Obviously, all of these factors affect what is a suitable production technology, cropping pattern and marketing system for a New Land farmer. Research and extension must be directed toward these issues. This will require separate data on costs of production and input-output relationships for the New Lands, by type of farmer, in order for farmers and policy makers to evaluate when and where production of what crops and animals will be economic and beneficial for themselves and for the country. Unless these data are reported separately in one way or another, reliably, they will have to be gathered a new each time a policy maker wants to make an informed decision about what policies to pursue.

2. METHODOLOGY

For this study the team reviewed available literature on New Lands and available statistical reports of MALR and its divisions. Publications of offices in other ministries dealing with New Lands were reviewed. The team interviewed officials in both the MALR and other ministries having responsibilities for the New Lands at the central level. The team visited four governorates and one development area with substantial area in New Lands, namely, Fayoum, New Valley, Ismalia, North Sinai and Noubaria. In each of these areas, agricultural affairs, statistics, sampling, horticulture and livestock officers were interviewed. The same was done in two districts of each of those five areas. Also, the team interviewed 4-5 farmers, one extension agent and one cooperative manager in each of two villages in each district. How data are collected, aggregated, stored and reported at each level was studied. These interviews also covered experience, training, resources, checking and reporting procedures.

In the interviews, as much data as possible was traced up the reporting chain in order to assess any changes that were made between reporting levels, and to determine the veracity of interview responses at one level about another. In each of the five governorate, the team interviewed a statisticians, sampling officers, horticultural officers, and livestock officer in addition to 19 cooperative managers and 19 extension agents.

At the national level, data provided by the various agencies to the Statistics Directorate for publishing was cross-checked with what was actually published. Recent statistical reports on New Lands were reviewed for presentation, content, consistency, continuity, accurateness and format. Instructions prepared by the Statistics Office for guiding its field agents in their collection of data, and its application in the field were reviewed.

At the farm level, the team conducted a pre-test for a questionnaire that was designed for use by EAS/ MALR field staff to collect information on cropping system, production, labor, power and other inputs needed to estimate cost of production. Ninety-two farmers provided responses. This followed the existing format preferred by the Statistics Office as much as possible and still got the details needed. The questionnaire collects information on market channels for up to three crop activities, including fruits and vegetables. It also collects data on livestock enterprises. The methodology concentrates on collecting crop area and livestock holdings data on all farmers, and more detailed input-output data for up to three selected pure crop enterprises. Alternatively, for farms that had significant livestock, more detailed data on livestock production was collected, but nothing was collected on inputs and marketing for crops. The combination is intended to provide good estimates of area and production of all crops and livestock numbers every time it is administered, and input and marketing data for only a few crops, with all priority crops being covered once over a three or four year rolling basis.

At the beginning of the study, it was intended to perform a statistical analysis of data consistency and independence between levels of reporting as was done for the study on data quality in the Nile valley governorates. It turned out that much less data on New Lands are reported as such, there was less consistency of reporting at the various levels of reporting, and it was not possible to have the same

access to data as did the study of the Nile valley governorates. Consequently this analysis is limited to a brief discussion of the much more limited data series that was obtained.

3. HISTORY OF TERMINOLOGY AND PROPOSED TAXONOMY

Before looking at terminology, it would be helpful to place the New Lands in Egypt into the larger perspective of Egyptian agriculture and the recent history of its development as it pertains to the New Lands. This will help the reader appreciate why the debate over New Lands in Egypt is so intense.

3.1 New Lands in Perspective

There are tremendous differences in the various estimates of additional land that could be cultivated in Egypt, depending on the type of soils, sources of irrigation, the time horizon for reclamation, and the institution that made the estimate. In 1985 The General Authority for Reclamation Projects and Agricultural Development (GARPAD) estimated lands suitable for reclamation during the period 1986-1996 to be 2.4 million feddans, distributed as follows: North and East Delta 438, West Delta 159, Sandy Desert Lands 1,139, Coarse Desert Lands 640, and the total is 2,376 thousand feddans.

In 1986, the government of Egypt carried out a Land Master Plan Study in order to provide planners with the technical information required to select the land most suitable for expanding the irrigated area. The study included reconnaissance soil surveys of 17.4 million feddans and semi-detailed surveys for 3.3 million feddans. It created an irrigation suitability classification system closely resembling the United States Bureau of Reclamation Classification system. On the basis of the Land Master Plan, 2.88 million feddans were considered suitable for development with Nile water, using canal water pumping lifts of no more than 150 m. A further 546,000 feddans could be irrigated with ground water, for a total of about 3.4 million feddans of potentially irrigable land. Of the 3.4 million feddans, about 30% have soils consisting of sandy looms. Over 50% are coarse to gravely sands. Medium to fine textured soils, usually the best for irrigation, are confined to the coastal strip along the Mediterranean and to the Western Desert Oasis. The distribution of these lands is detailed in Table 3-1.

3.2 History of Land Reclamation in Egypt

Several studies report different estimates of the total area reclaimed in Egypt, depending on the time period and locations covered. Heshmat (75) indicated that the area reclaimed during the period from 1952 to 1970 reached 891 thousand feddans. Guweily (72) indicated that the horizontal expansion was very slow during the sixties due to the limitations of irrigation water and lack of experience in land reclamation. According to GARPAD, the total land reclaimed between 1952 and 1997 is estimated at 2.7 million feddans, distributed as indicated in Table 3-2. More detail on these data, including the phasing over time between private and public reclamation activity, and a rough allocation by governorate, are included in Annex B.

These phases have a bearing on how reclaimed land might be divided for purposes of reporting agricultural data. The period before 1952 covers all lands that virtually every observer considers now to be old land. Many observers would argue that any land reclaimed prior to 1982 should also be considered old land.

Table 3-1: Distribution of Land Suitable for Irrigation Development

Development Region	Identified Area (000 fd.)	Priority area (000 fd.)
Nile Water		
East of Delta	799	612
West of Delta	685	264
Mid Delta	59	59
Middle Egypt	224	184
Upper Egypt	782	195
Sinai	283	212
High Dam Lake Shores	50	0
Sub-Total	2882	1526
Ground Water	546	82
Grand Total	3428	1608

Source: GARPAD.

Table 3-2: Distribution of Land Reclaimed between 1952-1997

Region	Area (000 fd.)
Sinai and East of Salam Canal	333
East Delta	590
Middle Delta	266
West Delta	1060
Middle Egypt	156
Upper Egypt	137
New Valley	93
Other Locations	18
Total	2653

Source: GARPAD.

For the Non-Egyptian reader there is a need to clarify the meaning of reclamation as it is used in Egypt. Reclamation is, in fact, an incorrect English term for most of this land, unless one goes back to pre-historic times. Only lands lost through poor drainage, salinity and other water management related practices are truly reclaimed. Almost all such areas are located in or near the Old Valley. Most were reclaimed before 1982.

Most of the land called "reclaimed" in Egypt is really desert land brought under cultivation for the first time after 1982. In English, it is referred to this as land development. However Arabic uses the same word for both reclamation and development; translated it means "to make the land better." Since the context is not always clear whether it means reclamation or development activities, and since the use of the word reclamation in English translations relating to these activities is well established in Egypt, it was decided to continue the use of the term reclaimed for both activities in this report.

3.2.1 Reclamation Activities Before 1952

Mohammed Ali started the modern process of land reclamation in the 19th century with installation of engineering works which provided, for the first time, water storage in sufficient volume to make summer irrigation possible. Land reclamation during this period was limited to expanding the cultivable area adjacent to the borders of the old lands of the Delta and the Nile valley.

The first modern land reclamation project in Egypt began in 1948 with the initiation of the Abis project, southwest of Alexandria, which contained many of the elements of reclamation projects that continue today. It became quite a successful land reclamation project as it has achieved its agricultural and social goals. It provides a good model for land reclamation in Egypt.

3.2.2 Reclamation Between 1952-1960

With the Egyptian revolution in 1952, government intervention in agriculture increased as the political thrust shifted to a command economy. The main agricultural policy objectives during this phase were to provide an assured supply of basic food commodities to all segments of population, and to become self-sufficient in all food commodities except wheat.

During this nationalist period, the government carried out a land reform program which limited the ownership of land, regulated land tenancy, and introduced land reform cooperatives. Policy makers were convinced that a market system could not be used to extract forced savings and surplus labor from agriculture for industrial development. Government agencies began actively regulating production, pricing and marketing of agricultural inputs and agricultural products. The government also started a direct land reclamation program on about 78,000 feddans south of Tahrir. This land was distributed to small farmers (78). Another ambitious land reclamation program was based on increased water availability during the summer season expected to result from construction of the Aswan High Dam (78). The ultimate effect of reclamation activities during this period was a substantial increase in drainage and salinity problems that were severe enough to force some land out of production. Because of rapid migration of people from the rural areas to the cities during this period, there was loss of agricultural land to urbanization as well.

3.2.3 Reclamation Between 1960-1970

In 1961, the government created state owned enterprises to market, distribute and export all agricultural commodities. All farmers were required to join the agricultural cooperatives. The cooperatives were used by the government to supply inputs and enforce production quotas. The government promoted agricultural production with subsidized inputs provided through the cooperatives, and by increasing land reclamation made possible by the completion of the Aswan high dam. Reclamation of new lands shifted emphasis from small farmers to large state farms and public land development companies.

Public sector companies that operated most of this reclaimed land during this period were less effective and less efficient than the private sector in terms of land use, yields, and costs (78). Only about 58% of the reclaimed land was actually cultivated, and only 24% is considered to be fully productive. During this period about 500,000 feddans were brought under cultivation, with much more land than that being reclaimed.

3.2.4 Reclamation Between 1970-1982

In 1974 the government began redirecting economic and political policies away from complete state domination of the economy. There was growing concern over the high cost and inefficiency of the public sector companies conducting land reclamation. The government began encouraging the private sector and foreign investors to reclaim new lands. This led to a virtual moratorium on new public land reclamation activities. The emphasis shifted to distributing state land to landless laborers from old lands.

Most of the reclamation from 1952 to 1982, especially that prior to 1973, was on the heavier soils of the Northern delta where the major reclamation requirements were drainage and desalinization of water logged and saline lands - true reclamation activities. These lands are commonly referred to as the old new lands.

3.2.5 Reclamation Between 1982-1992

After 1982 land reclamation efforts were stepped up, with an emphasis on the private sector. Government began distributing state farms to employees and other needy citizens, formed land development companies, and initiated the Mubarak Young Graduates Program, a program for encouraging unemployed graduates of the country's expanding university system to settle in the reclaimed areas. Overall, more than 800,000 feddans were reclaimed during this period.

Shift to Desert Land Development. After 1973, and especially after 1982, land development efforts concentrated almost entirely on sandy desert soils. This shift to desert lands was documented in the Land Master Plan (20). This analysis of land suitable for future reclamation indicated that three-fourths of the land available for reclamation was on sandy and coarse soils. Satellite imagery used to measure desert land shifting to crop land in the Delta to a few kilometers south of Cairo showed that 450,000 feddans shifted from desert to crop land between 1972 and 1990.

The Mubarak Young Graduates Project. The Mubarak Project settles new graduates and social beneficiaries on lands reclaimed under the supervision of GARPAD. The project is a major user of lands reclaimed by GARPAD. The Government of Egypt initiated the project in 1987 to provide graduates with five feddans of land, basic infrastructure, and an on-farm modern irrigation system. Graduates also receive from GARPAD a first leaching of the soil, a house and a monthly salary of LE50 for the first four years. After the first four years, the graduates are supposed to pay the government a nominal cost, LE18,000 for the land and house over 30 years. Low productivity of land and low returns from cultivating traditional crops have prevented some graduates from paying their land and house installments.

3.2.6 Reclamation Between 1993-1997

The fifth five-year plan proposed the reclamation of 572,700 feddans, of which about 469,900 were actually reclaimed. During this period, private investor participation in developing the irrigation infrastructure increased from one third of the reclaimed area in 1987-1992 to more than two thirds of the total reclaimed area in 1993-1997. About 33,800 beneficiaries supervised by the Mubarak Project received 196,000 feddans during this period (5 p. 7).

3.2.7 Land Reclamation Projected Under The Current Plan 1998-2002

The targets for land reclamation during the sixth five-year plan covering 1998-2002 are as follows:

- Complete the infrastructure works for 428,000 feddans, of which 265,000 feddans in North Sinai, and 163,000 feddans in locations identified in previous plans.

- Execute basic infrastructure works for 333,500 feddans in proposed reclamation areas.

- Execute basic infrastructure works for 886,500 feddans to be allocated to investors and cooperatives. This includes about 500,000 feddans allocated to investors in Toshki.

- Reclaim and cultivate 250,000 feddans to be distributed to 50,000 graduates (10,000 graduates every year) and establish agro-industrial communities.

- Cultivate additional 994,000 feddans out of which 175 thousands feddans in Sinai, 212 thousands in East Delta, 90 thousands in Middle Delta, 145 thousands in West Delta, 29 thousands in Middle Egypt, 100 thousands in Upper Egypt, 238 thousands in Western Desert and Nile Valley, and 5 thousands in Halayeb and Shalateen.

- Complete the first stage (87 km west of Suez canal) of the Salam Canal to provide irrigation for about 212,000 feddans using agricultural drainage water mixed with Nile Water from the Damietta branch.

- Complete the second stage (length 155 km) of the Salam Canal to irrigate about 400,000 feddans in Sinai.

- Build the Sheikh Zayed Canal (Toshki). The canal's first stage will have a total length of about 310 km and a pumping station with capacity 25 mcm/day. This will allow cultivation of 500,000 feddans in the first stage of the project.

This ambitious program is part of a long-term plan to reclaim about 3.4 million feddans by the year 2017, at an annual rate of 150,000 feddans.

3.2.8 Summary of Land Reclaimed And Its Allocation

As of the end of 1996, GARPAD and its predecessors had reclaimed about 2.6 million feddans of New Land. Table 3-3 shows how this development occurred over time. Table 3-4 shows how the land was allocated, which does not mean the same as distributed, since not all allocations are, in fact, distributed. It shows that about 15% overall went to graduates, and perhaps as much as 19% went to individuals who are supervised by the Mubarak Project, depending how many social beneficiaries and small holders are included. The same proportions are 23% and 27%, respectively, of what was allocated during the 1988-97 period. These estimates are rough, as the data do not always pertain to exactly the same time period and, when they do, are not always the same data. For example, the data for 1982-97 are amounts intended to be reclaimed in each of the plan periods. The amount actually reclaimed for 1992-97 was 469,900 versus 572,000 planned to be reclaimed. Data prior to 1982 appear to refer to land actually reclaimed.

Estimates of how much reclaimed land is actually distributed and, how much of that is actually cultivated vary widely. Hussein et al (1999) report that, as of June 1996, about 400,000 feddans were allocated to graduates, but only 237,000 were actually distributed, a ratio of about 60%. Moreover, not all of the land that was distributed is being cultivated. Common estimates of the amount of reclaimed land actually cultivated by all users range around 1.5-1.6 million feddans (51), with some estimates as low as 1.1 million feddans. These proportions are important when we come to trying to determine the completeness of data reported for the New Lands in MALR statistical reports.

3.3 Implications for Data Collection and Reporting

Risk and uncertainty have always been important considerations in the process of selecting lands to reclaim. Initial planning and development of new lands emphasized more productive land requiring lesser investment per feddan. Most of this land is now reclaimed. Per unit costs and risks are increasing as land development extends into more marginal areas. This has increased concern with the technical and economic feasibility of adding new land, especially as Egypt began seeking international support for new land development.

Table 3-3: Area Reclaimed or Planned to be Reclaimed During the Period 1952-1997

Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
				Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
East Delta	20,400	53,900	74,010	12,000	15,720	27,720	34,820	123,770	158,590	40,350	198,430	######	235,480	237,920	573,400
Middle Delta	5,700	141,000	8,600	7,800	4,975	12,775	14,685	36,000	50,685	5,000	22,500	27,500	182,785	63,475	246,260
West Delta	42,500	320,669	39,920	96,500	……	96,500	79,677	132,748	212,425	74,842	47,028	######	654,108	179,776	833,884
Middle Egypt	6,700	76,700	….	….	4,900	4,900	11,450	11,100	22,550	13,750	25,000	38,750	108,600	41,000	149,600
W. Coast /N. Valley	3,400	57,800	10,900	4,670	9,000	13,670	24,100	130,000	154,100	11,950	34,000	45,950	112,820	173,000	285,820
Saini	100	11,258	7,000	9,800	1,250	11,050	14,800	220,000	234,800	34,000	45,950	######	173,000	285,250	331,608
Other Areas	….	….	….	….	18,341	18,341	….	….	….	….	….	….	….	18,341	18,341
Grand Total	**78,800**	**735,527**	**144,280**	**131,770**	**58,038**	**189,808**	**187,132**	**663,168**	**850,300**	######	**399,958**	######	**1,450,251**	**1,121,164**	**2,571,415**

Source: GARPAD, 1997.

Table 3-4: Reclaimed Land Allocated to the Graduates as of 06/30/1996

	Disposed 1952-1981	Disposed 1982-1988[1]	Disposed 1988-1992	Disposal Program 1993–1997
Social Categories		41,800	25,300	42,300
Graduates	30,900	10,400	179,600	159,000
Small Holders	327,300	NSS	3,000	NSS
Cooperatives	13,600	NSS	91,200	NSS
Government	555,200	NA	1,000	0
Private Sector	57,700	72,162	55,500	359,000
Investment Sector	3,500	NA	177,500	311,700
Undisposed	52,000	NA	NA	NA
Squatters	NA	NA	76,150	NA
Total	**1,040,300**	**[2]189,800**	**607,400**	**872,000**
Proportion covered by Mubarak Project [3]	**NA**	**6-28%**	**21-33%**	**18-23%**

Source: Data are taken from various parts and tables of Hussein et al. (1999).

NA = Not available
NSS = Not separately specified; apparently included in major heading total.

(1) Area planned to be reclaimed according to the 1982-87 plan was 189,800 feddans. The source states that 5,5% of this was allocated to graduates, 22% to social beneficiaries and 38% went to the private sector. No other details were given for this period.

(2) Area for graduates who obtained new land under the Mubarak Project is also reported as 225,430 for this period in this report.

(3) The range for the proportion covered by Mubarak Projects depends on whether social beneficiaries are included or not.

There are two schools of thought on this issue in Egypt. One advocates what might be called horizontal expansion up to the limits of the natural resource base, regardless of the cost relative to the short-run and discounted medium and long-term benefits. The implicit assumption is that non-financial benefits such as increased employment, relocation of people from the crowded old land to the new land, increased food security, and increased national security from occupying vacant lands along frontiers, though difficult to quantify in monetary terms, are substantial enough to compensate for any low or negative financial return. It is difficult to challenge this school of thought, since many of the non-financial benefits are so difficult to quantify in a way that everyone finds meaningful.

A second school of thought holds that all development investments should pass at least a minimum test of economic feasibility. A project should not be supported unless it will generate an economic rate of return on the country's resources that is at least positive or, better yet, greater than the current rate of interest. This approach argues that investments in reclamation should be treated no differently than investments in services that increase production or improve land productivity in other ways. Both should be subject to quantitative analysis, and investment should be directed toward the choice that provides the better economic return to the country's scarce natural and financial resources.

This debate takes on added importance as Egypt approaches the limit of its combined surface and underground water resources. The most common view is that the limit will be reached with a total of 8.5-9.0 million feddans of land under irrigation. That is 1.5-2.0 million more feddans than at present, versus much more ambitious plans under the 20 year reclamation strategy established in 1997. To inform this debate the Government needs data with sufficient detail, either by classifying reclaimed areas into analytical as opposed to administratively meaningful categories, or by gathering data on individual farms so that determinants of production and performance efficiency can be measured directly. In the long run, the latter approach is probably the only way to get data that is rich enough to draw the kind of strong conclusions one would like when spending millions of pounds. In the short run it should be possible to structure and classify administrative data so that they provide enough detail to permit the kind of analysis that can help avoid making a major mistake in planning for the New Lands.

As can be seen from Table 3-4, the allocation of reclaimed lands has shifted over time to different economic groups. Much of the land initially distributed to the Government and to public land companies between 1952-1970 has since been redistributed to other economic groups. The major groupings into which existing New Lands fall, and for which separate data may be desirable for planning purposes are the following:

Smallholders: These are small farmers, landless laborers and others who received initial or redistributed allocations of reclaimed land in the Nile valley. This group was not resettled. Any change in residence required by the new allocation was borne by the farmer himself. Most of these lands should be classed as old valley lands and data on them should be included in data for the Nile valley. The size of these holdings initially ranged from 10-15 feddans.

Graduates: Initially these were recent graduates from the countries bulging universities. More recently there is evidence that a majority of new graduates are only high school graduates. This is an important

unanswered question as it may indicate that returns to the kind of reclaimed land given to the graduates are not high enough to interest an unemployed university graduate.

Beneficiaries: This group consists of various social or disadvantaged groups which, like smallholders, have been targeted for special assistance, but have been resettled on to newly reclaimed land. This resettlement is done under the supervision of the Graduates Project. Beneficiaries may include veterans, landless laborers and other groups.

Small Investors: This group is the most difficult to define. Its definition seems to have changed over time. Today it appears to mean a private investor who, with his own money and for his own account, purchases and develops reclaimed land from the government, often in areas that are also served by the Graduates Project, usually at some distance from his previous home. Some of these investors simply hold the land for speculative purposes, some receive help from the Mubarak Project to develop it, and some are completely on their own. We do not know how many fit into each category.

Large Investors: This is another fairly diverse group. Some consider a farm in excess of 30 feddans to be a large farm; others in excess of 80-200 feddans. There is another class of very large farms, in excess of several hundred feddans, owned by several individuals but operated as a single economic unit. Finally there are industrial farms, military farms and large farms owned by individuals. This lack of a clear definition is clearly one factor leading to incomplete coverage of this population of farmers in the data on the New Lands.

Squatters: There is not a lot written about squatters, even though the team has the impression that squatting is a viable and widely used method of acquiring title to land. Some squatters make very large investments in reclamation and development activities, with the hope and expectation that once faced with a *fait accompli*, the government will deed them the land for a nominal sum, which, apparently, it usually does. The great advantage of squatting is that there are no real estate taxes to pay and the property rights of squatters are recognized in at least some form. Squatters can range from holders of small parcels along canals who steal irrigation water, to large farmers who sink wells and invest in expensive surface irrigation systems completely under their own control.

Public Sector: The public sector holds all reclaimed land that has not yet been allocated to one of the other holder groups. It can't be ignored because this is where squatters make their inroads. Much more has been simply put into production first by squatters, who then petition the government to sell it to them at a fairly low price, in recognition of the improvements they have made.

In terms of a data collection system, there must be various ways to reduce the number of holder classes. Data on graduates, beneficiaries and small investors assisted by the Mubarak Graduates Project represent one logical group. Small investors not under the supervision of the Graduates Project represent another one, as do large investors and squatters, respectively. Since 1982 these have been the primary recipients/takers of reclaimed land. Whether to follow smallholders as a class will depend on the definition of New Lands MALR adopts for an upgraded data collection system directed at the New Lands.

3.4 What Are The New Lands

Common definitions of the New Lands among researchers and administrative leaders in Egypt include those based on when the land was brought into production, how long it has been cultivated, where it is located, how the land was developed, the irrigation technology employed, drainage system, and water source. Some go so far as to suggest a definition based on how title is held, whether or not the owner is a member of a cooperative, or whether the land is taxed.[1] Some of these definitions are more workable than others, but most reflect the judgement of someone that the defining factor is important for what happens on the new land, or for creating a meaningful distinction between new and old land areas.

All of the geographical definitions of New Lands are complicated by the fact that many areas have undergone continuing reclamation activity over time; a single area can have several different types of irrigation technology and sources of water; some have been reclaimed for so long they are now treated as old lands for purposes of agricultural extension and statistical reporting; and some are interwoven with old land in the old valley in such a way it would be difficult to separate them. Moreover, most of the land currently under cultivation in some Governorates classed as New Land Governorates is, in fact, old cultivated land. Unless these areas can be separated somehow, it may be difficult to get from the current statistics program the kind of specific data needed for planning New Lands' development.

3.4.1 Current MALR Definition

The Ministry of Agriculture and Land Reclamation (MALR) classifies agricultural land in Egypt into two categories. Old land includes all cultivated areas in the Nile valley and the Delta which have been under cultivation since before 1952, plus cultivated area in a two kilometer band of land around the administrative districts that define these areas. The two kilometer buffer creates a space beyond which it can be presumed new infrastructure will be necessary and soil type will be sandier. The MWRI estimates these old lands to be 5.4 million feddans. New lands include reclaimed lands inside the Nile valley governorates that are located beyond the two kilometer buffer from the administrative borders of the old land, plus all land in certain governorates and development areas that either now, or in the future, will contain mostly New Lands. Reclaimed lands inside of the administrative boundaries defining the Nile valley are to be classified as old-new land.

This working definition of New Lands that the MALR has adopted reflects the fact that much, though not all, of reclaimed land was open desert prior to reclamation. Over time, many of these areas have been incorporated into new administrative areas, but even today there are parts of some governorates, such as Fayoum, that are still not in any statistical reporting unit. As New Lands have come under cultivation the corresponding change in the coverage of existing statistical units, either by adding new districts, or expanding the geographical definition of existing ones, has not kept pace. Consequently, some of the areas are not served or are poorly covered by extension agents and cooperatives, the lynch pin in the administrative statistics system which MALR uses.

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[1] New Lands are not taxed, only the *zimam* are. This is probably the clearest definition of New Land from a legal perspective. However it is virtually impossible to apply to a system of administrative statistics.

For all of its simplicity, the real weakness of the MALR definition of New Lands is the difficulty of doing a good job of separating land in those districts within the Nile valley governorates where there are substantial amounts of old and reclaimed land interwoven with each other, such as Ismailia and Sharkia. It also does not distinguish between old and new lands in those governorates classified entirely as New Lands, even though some, such as North Sinai, contain more old land than new land.

3.4.2 The Proposed Definition

The study team believes that administrative boundaries should not be the primary factor in classifying new lands; the usefulness of the data for planning and policy analysis should be. A non-administrative definition offers to respect better those factors that give rise to different performance characteristics for New Lands versus old lands in the first place. It is possible to arrive at a non-administrative definition that is quite workable in practice, using the existing structure for providing administrative statistics. Accordingly, it is suggested that an initial working definition include all lands reclaimed since 1952, sub-divided as follows.

First Phase New Lands. Until 1982 land reclamation and development in Egypt was concentrated on waterlogged and saline soils located mainly in the Nile Delta. More recently, development efforts have concentrated on desert lands on the edge of the already existing cultivated lands, utilizing a combination of Nile water delivered through irrigation canals and development of underground water. Therefore, 1982 provides a logical dividing point between a first and second phase of reclamation activities.

First Phase New Lands include all lands that have been reclaimed since 1952 which are located as plots or strips within the old land administrative areas, whether in Lower Egypt, Middle Egypt or Upper Egypt. Sometimes this is referred to as Old-New lands. Most of these lands previously faced problems that limited their use in agricultural production, like waterlogging or salinity of the soil prior to reclamation. Examples of this class of new lands are: North Delta in Kafr El-Sheikh governorate; El-Nahda and Maryout in North Noubaria; Abis and Kuta in Beheira governorate; and Tamia, Itsa, and Ebshway in Fayoum governorate.

The majority of First Phase New Lands have soils and cropping patterns which are similar to the old valley (cereals and cotton). There was no relocation of farmers or resettlement programs involved in these reclamation activities. Once fully reclaimed, these lands can be grouped with Nile valley land for analysis purposes. A few of these areas have experienced continual reclamation activity up to the present. This makes it necessary to separate the land in each area into pre and post 1982 reclamation areas, or group each entire area with the phase that predominates in it.

Second Phase New Lands. This is the most heterogeneous class of New Lands and may have to be subdivided further once analysts know more about them. These are mostly desert lands outside of the old lands, but relatively close to the Nile valley and the delta. They have been reclaimed since 1982. They may or may not be located within a Nile valley governorate. Most have been reclaimed during the last three decades and much, but not all, of the area is now above marginality, i.e., many have achieved the maximum potential they can expect from reclamation activities alone. Researchers (16) have referred to these as New-Old Lands. Examples of such lands include the West of Noubaria Agricultural Intensification project covering about 900,000 feddans; North and South Tahrir region and El-Khatatba south-west of the delta; and El-Salhia east of the delta. Most of these lands adjoin the Delta to the west.

The Second Phase New Lands have a cropping pattern that is different from that of old and First Phase New Lands in that they include more high value crops (fruits and vegetables) and less traditional field crops (cereals and cotton). Many of these lands have involved relocation and resettlement of farmers, farm families and agricultural workers from the old land to these newly reclaimed areas. Therefore, tremendous investments were made to provide agriculture and social infrastructure, much of which are still incomplete. Various types of agricultural producers operate on these lands: big investors, small investors, beneficiaries, graduates and squatters. Only the big investors operate large farms utilizing a high level of technology on their farms. Due to the scarcity of irrigation water, these lands depend to a large extent on more efficient and more expensive systems of irrigation like drip irrigation or sprinkler irrigation. Some farmers in the more remote areas might use underground water for supplemental irrigation.

Third Phase New Lands. The Third Phase New Lands are those located far away from the First Phase New Lands. These are lands in the process of reclamation and are expected to be distributed to big companies that are capable of managing production of high value crops, mainly fruits and vegetables for the export market. They will depend on high cost, high levels of technology in reclamation, cultivation and marketing. Examples of these lands include Toshki, East of Oweinat in Upper Egypt, and the area around the El-Salam canal in Sinai. These lands are expected to depend on highly mechanized agriculture with highly mechanized farming activities. They should be easy to report on separately. Some researchers have referred to these as New-New lands.

3.5 Implementing A Broader Definition

It was recognized that there is a need to reduce, rather than increase the number of definitions and classes of New Lands. However, it was believed that a broader definition than that now used by the MALR, properly applied, can improve the quality of agricultural data available for the New Lands and for agricultural planning, without greatly complicating the task of collecting administrative statistics. The first step is to define the population and the reporting units for which data are to be collected, in an unambiguous way. The second step is to ensure that the entire population is covered when administrative statistics are collected. As our analysis will show, this is not now the case. With a little thought, this system can be integrated with a more scientific approach based on statistical sampling techniques, initially applied to New Land areas only, as will be discussed later, to get better quality data.

There is room in this approach to define somewhat different categories of New Lands than the three phases that were suggested. The approach puts the emphasis on soil type, time since reclamation and cropping system. Obviously, there is some overlap between the three phases. Another definition might emphasize time more, and make 1982 an absolute dividing line between first and second phase New Lands. In either instance it will be necessary to try to decide between the various phases those few areas where reclamation activities have been continual since 1970 or earlier. The study team has the impression that individual reclamation activities within such ongoing reclamation areas are sufficiently discreet and sufficiently large as to make such a division for data collection and reporting purposes quite feasible.

4. REVIEW OF LITERATURE ON AGRICULTURAL PRODUCTIVITY IN THE NEW LANDS

The Egyptian government has made a significant investment in land reclamation projects. The cost of reclamation varies from LE 3,000 to LE 10,000 per feddan of crop area for canals, pumping stations, main roads, electricity transmission facilities, utilities and related buildings (78). Remote areas and areas that have higher pumping lifts cost even more. For graduates and small holders the government carries out initial farm development, including land leveling, installing irrigation and pumping systems, and construction of housing. This level of investment currently costs a minimum of LE 3,000 per feddan, and the house costs another LE 15,000 - 20,000 per farm (78). It is Government policy to subsidize the initial investment costs by charging holders only half of the development costs. Users also pay for the ongoing costs for operating the canals which serve these areas. These costs average about LE 109 per feddan per year.

It is not clear from the available studies whether these costs are per feddan of area reclaimed or per feddan of area actually cultivated. There is a substantial difference between the two. Several studies (5, 78) indicated that area actually cultivated amounts to only 60% of the area reclaimed. Unless financial and economic analyses adjust for this lower level of utilization of reclaimed lands, they will underestimate the true cost of bringing new land into production under the horizontal expansion strategy.

4.1 Cropping Patterns in The New Lands

The main fruits in the new land are apples, grapes, figs, dates, peaches, apricots, and almonds, while main vegetables are tomatoes, peppers and watermelon. Table 4-1 contains data for main fruits and vegetables for the selected governorates in our study. In Ismailia, mango, citrus, olives, tomato, and potato are the main horticulture crops. In Fayoum, olives, citrus, mango, apricot, tomato, and squash are dominating. In out of valley governorates, the major crops in the New Valley are dates, tomato, and watermelon, while North Sinai is known for peach, olives, figs, cantaloupe, and tomato. Noubaria is a major producing area of fruits and vegetable crops. Citrus, grapes, apples, olives, banana, peaches, tomatoes, watermelon, potato, squash, pepper, and eggplant are some of the more important crops.

4.2 Productivity, Yields and Cost of Production in the New Lands

In Egypt productivity, when used by itself, means the productivity of land, in other words, yield. When productivity refers to other types of inputs, such as capital or labor, an appropriate modifier is typically added. In this report the conventional non-Egyptian use of the term is retained. Productivity means output per unit of input. When used by itself it means the productivity of all resources used in the production process, not just the productivity of land.

Table 4-1: Distribution of Fruits and Vegetable Cultivated Area in The Sampled Governorates

Govern.	Tenured Areas	New Lands	Crop Fruit Area	Main Vegetable Crops							Main Fruit Crops				
				Tomato	Potato	Cucumber	Pepper	Eggplant	Squash	Others	Olive	Citrus	Mango	Peach	Others
Ismailia	141796	67073		18827	9830	7738	6258	-	4303	G. Beans 3777	8704	11566	30925	-	
Fayoum	343956	10932	21677	19815	-	3950	2038	3276	4503	Cabbage 3657	6531	5874	4300	-	Apricot 3030
New Valley	71749	4124	3833	1847	-	-	-	-	-	W. Melon 1176 Melon 142	1065	1344	-	-	Date (female/no) 736818
North Sinai	205085	13109	107004	4062	376	1551	-	426	-	W. Melon 1551 Cantaloupe 5111	11311	-	-	7076	-
Noubaria	720000	320123	292512	112466	30972	-	13292	12061	21666	W. Melon 43043	23840	88985	-	13963	Grape 70834 Banana 15841

Source: Personal communication with Mr. Ibrahim Sheta, Director, Central Administration for Horticulture, MALR.

Productivity on the newly reclaimed lands varies from area to area and among the different categories of operators. It depends mainly on the type of soil, availability of irrigation water, the cropping pattern and the prices received for the output. The cropping pattern that characterizes the new lands includes more land in horticultural crops and less in traditional crops than on old lands. In general, previous studies indicate that productivity of the new land is lower than old land especially on small farms, due to the various problems faced by operators, i.e., a general lack of economic infrastructure as indicated by poor availability of agricultural credit and inputs, and poorly developed markets for horticulture crops. Obtaining optimum benefits from reclaimed land will require provision of agricultural services such as research, extension, training, credit and production packages, improved on-farm irrigation water management, and availability of appropriate market facilities and support for community growth and beneficiary participation.

The New Lands Development Study (NARP, 1994) indicates that yields among small and medium sized farms tend to be significantly lower in the new lands than in the old, but that varies by crop and production system. Yields on industrial farms exceed national averages for maize, peanuts, tomatoes, green peppers, cantaloupes, bananas and oranges. These are the crops with higher risk, but also higher prices and greater profit potential if managed well. These larger farms have access to capital and technical expertise that is not available to small farmers (beneficiaries, small investors, and graduates). Some big farms depend on foreign technical expertise, in addition to having access to alternative sources of water or power. These factors help explain the substantially higher yields on the agro-industrial farms. The lower yields on small farms may also arise from land that has not yet been farmed long enough to benefit from soil improvement strategies required for full reclamation. Table 4-2 compares yield data for the old and new lands for selected horticultural crops.

Another set of data was obtained from the Central Administration for Agricultural Economics on the cropping patterns in new lands managed by graduates. Table 4-3 shows that olives, citrus, banana and grapes are the most dominant fruit crops in the new lands. Table 4-4 shows that tomato and watermelons occupy the greatest cultivated area for vegetables. Separate data for small investors and beneficiaries are not available.

Livestock data in Table 4-5 do not suggest much difference in performance between old and New Lands, except that milk yields for all but highly managed herds appear to be somewhat lower. This is what one would expect given the much lower level of extension services and less developed input markets in the New Lands. In addition, many farmers, graduates in particular, lack the experience to manage even traditional or crossbred cattle well, and lack the credit to purchase exotic cattle.

Costs of production vary widely in the New Lands, but are generally higher than the national average of the old lands for most crops**.** Manure use and cost is significantly higher in the new lands than in the old. This is a reflection both of its greater value for maintaining the fertility of sandy soils and its more limited supply. Studies have found that new land farmers used higher levels of nitrogen fertilizer per feddan for legumes. On the other hand, the amount of nitrogen utilized for maize is lower than that on the old lands and lower than agronomic recommendations.

Table 4-2: Comparison of Yields of Horticultural Crops in Old and New Lands, 1994

(Tons/feddan)

Vegetable	New Lands	Old Lands
Potato	7	15
Tomato	20	12
Peas	4	4
French Beans	2.5	3.5
Watermelon	10	10
Strawberry	9	2
Cucumber	9	7
Squash	10	7

Source: Mohamadein S., 1994. Farming Systems: Vegetables. In NARP, New Lands Development Study vol 1, MALR/USAID.

Table 4-3: Area, Yield and Production of Fruits in the Graduate Projects,1998

Fruit	Total Area (Feddans)	Fruitful Area (Feddans)	Yield (tons/feddan)	Production (tons)
Citrus	7460	2287		16120
Grapes	2114	619	8.80	5448
Mango	1556	278	3.01	838
Banana	2536	904	13.37	11181
Figs	464	269	6.47	1740
Prickly Pears	621	223	11.90	2654
Guava	1021	717	6.00	4301
Pomegranate	550	316	6.85	2165
Apricot	961	104	4.07	423
Pears	133	24	4.50	108
Apples	4302	515	5.52	2845
Peach	887	23	2.83	65
Plums	129	55	3.51	193
Olives	13299	2151	4.43	9520
Others*	370	6		10
Total	36413	8491		57611

*Loquat, Almond, Annona, ...etc.

Source: Economic Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration for Agricultural Economics, as received from the Central Administration for Development (Moubarak Project for Graduates).

Table 4-4: Area, Yield and Production of Summer Vegetable Crops in the Graduate Projects,1998

Vegetables	Total Area (feddans)	Yield (tons/feddan)	Production (tons)
Tomato	35051	9.87	345938
Squash	6408	7.33	47001
Green Beans	1667	5.09	8491
Kidney beans	468	4.04	1890
Peas	1373	1.55	2128
Eggplant	4098	9.60	39336
Pepper	4406	5.89	25937
Cabbage	12	6.92	83
Watermelon	31588	11.35	358374
Melon	70	10.99	769
Cucumber	496	7.56	3941
Cantaloupe	2604	6.00	20438
Okra	243	10.00	2430
Jews Mallow	218	8.40	1831
Sweet Potato	4	7.00	28
Others	7899	5.00	39495
Total	96605		898110

Source: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration for Agricultural Economics, as received from the Central Administration for Development (Mubarak Project for Graduates).

4.3 Returns on Reclaimed Land

In reclamation projects as currently implemented, farmers generally receive positive returns to their investments (78). In areas with reliable water supplies and favorable marketing situations, small farmers and investors can receive attractive returns. On the economic level, however, which combines both farmer and government costs and benefits, the Economic Rates of Return (ERR) were found to be low for some areas or even negative for one area under study. With intensification of support and better administration for new projects, the ERR could reach 7-19 %. In contrast, estimates of the ERR could reach 19-42% after improving existing new land projects.

Low productivity has made private financial returns on most small farms marginally acceptable. On the other hand, large farms as a group realize much higher net income. (84) reports that their produce was sold in the market at prices averaging about 50 percent higher than produce from small farmers. A greater proportion of their sales are made to intermediaries further up the marketing channel, particularly sales in export channels. Larger farmers obtain higher yields, in significant measure because of their

ability to deal with constraints that plagued small farmers, such as irrigation system operation and maintenance, lack of information on production technology, and lack of good input markets. Higher prices, a much higher percentage of land allocated to fruits and vegetables and higher yields combined to give large farmers a per feddan value of production that frequently was 3-4 times that of small farmers. Finance is a problem for almost all farmers in the New Lands, but is generally more severe on small farms.

Where livestock were kept in the New Lands, net farm income was significantly higher. However, only about 50 percent of the smallholder farms had livestock. Livestock provide a way to use available family labor and utilize farm byproducts and waste. A lack of finance appeared to be the major obstacle for keeping livestock. However, so is the fact that many graduates and other family members had regular jobs outside the community in order to help support the farm. This prevented them settling in the area, a requirement for livestock production.

4.4 The Impact of Policy Reforms on the New Lands

In 1991, Egypt signed an agreement with the International Monetary Fund (IMF) to carry out an Economic Reform and Structural Adjustment Program (ERSAP). The program sought to create a decentralized, market oriented economy through encouragement of the private sector, privatization of certain public sector enterprises, reduction of most controls on investment and on imports, and reducing subsidies and price controls in all sectors, particularly agriculture, energy and transport. The response of the agricultural sector as a whole to these reforms was significant. However, the structural adjustment presented economic difficulties for newly reclaimed lands due to the reversal of the comparative advantages they had previously enjoyed. Most significant were sharp increases in prices for fertilizers, pesticides, and energy as a result of the liberalization policy. This caused costs per unit to increase more rapidly in the new lands because of their higher input requirement and greater dependence on pumping for irrigation water.

At the same time prices for horticultural output were declining in real terms due to the rapid expansion of fruit and vegetable production by private investors on reclaimed lands during the late 1980s, and by farmers in the valley in response to removal of production quotas for field crops. Since many Nile valley farmers are nearer to major markets, they have a comparative advantage in supplying these markets with perishable produce. As a result, small farmers in the new lands shifted from the production of horticultural crops to the production of field crops as profits from the former shrank.

4.5 The Impact of Other Policies and Constraints

Water policy in Egypt has been crucial to the development of new lands, and yet water delivery and irrigation are a major constraint to efficient agricultural production there. Immediately following availability of water from the High Dam, double cropping increased greatly, and excess water application resulted in waterlogging and salinity problems. This led to a long-term loss in land productivity and the waste of scarce water resources. Moreover, farmers in land reclamation areas are greatly handicapped by deficiencies in the irrigation delivery system. These problems seem to affect most those graduates and small farmers on the tail end of the systems.

Table 4-5 a: Distribution of Livestock in New Lands, 1997

Area	Buffalo	Cattle	Sheep	Goats	Poultry	Camels	Draft
Nubaria	19,700	60,300	31,000	11,000	181	90	2,000
Ismailia	NRS	NRS	NRS	NRS	NRS	NRS	NRS
North Sinai	73	1574	139,000	249,000	NR	14000	75,000
New Valley	680	62,000	32,600	71,000	NR	880	13,500
Sharkia	NRS	NRS	NRS	NRS	NRS	NRS	NRS
Fayoum	NRS	NRS	NRS	NRS	NRS	NRS	NRS
New Lands (old valley)	NRS	NRS	NRS	NRS	NRS	NRS	NRS

Sources: Statistics of Animal Wealth, Poultry, and Fishery, MALR (1997)
NRS = Not reported separately.
NR = Not reported.

Table 4-5 b: Performance of Livestock Production in New Lands and Valley, 1997

	Milk Yield (kg./day)		Length of Lactation (day)		Age at 1st Calving (month)		Period Between 2 Calvings	
	New Land	Valley	New Land	Valley	New Land	Valley	New Land	Valley
Baffalo	6	9	280	283	38	36	-	432
Cattle (Baladi)	4	5	295	295	36	34	-	432
Cattle (Exotic)	20	18	305	300	27	27	-	400
Cattle (Cross)	10	12	295	296	30	30	-	404

Sources: IFAD/NLASP – Nubaria
APRI/FSDP
Personal Estimation

In the 1980s, agricultural production in the New Lands suffered from rigid policies, particularly fixed input packages tied to credit programs which failed to allow for the greater fertilizer requirement of new lands, or from a shortage of fertilizer in general. During this period the development of a broad-based private market system was discouraged in favor of direct market intervention directed at strategic crops by the Principal Bank for Development and Agricultural Credit (PBDAC), the agency that was responsible for input distribution and marketing of strategic crops until 1990. Yet PBDAC did not develop much of a network in the new lands. As result, both input and output markets have, in general, been weak in the New Lands.

4.6 The New Lands Development Study

The New Lands Development Study (NLDS, 1994) provides some of the best data currently available on New Lands farmers. It was a major data gathering exercise that looked at both small and large farmers and both input and output markets, using a variety of data gathering techniques.
Based on a sample survey of small farmers this study concluded that the data do not support the hypothesis that small farmers and graduates differ significantly in levels of individual crop yields or in intensity of land use. It found that total production costs were very similar for the two groups. Small investors use land less intensely than small holders and graduates; and they have more land in fruits and less in field crops. There were significant differences among survey areas, but these were largely a function of soil type, project age and water source.

The findings of a Rapid Rural Reconnaissance Survey (RRRS) carried out as part of the same study found that irrigation water was often lacking in both quantity and quality for most farmers, who complained of a general shortage and seasonal shortages. In general, only investors using underground water did not mention water as a constraint on their production. The study confirmed the findings of other studies reported earlier, namely that farmers in the New Lands lack marketing facilities, sources of finance and credit, and lacked technical information and extension support.

The study of large farms carried out under the study found that the larger farms concentrated on a few major crops, but taken together, they covered a large number of crops, with an emphasis on fruits, especially grapes and apples. Wheat was the third most common crop. Although many of the fruit trees were new and had not yet reached their optimum fruit bearing years, yields were quite a bit higher (30% for grapes, 60% for citrus, and 62% for bananas) than the national average. They reported higher yields than the national average for some field crops; like alfalfa and fava beans, but yields for other crops like wheat and onions were below the national average. These large farms perform sorting and grading as a means to differentiate their products in order to obtain higher returns.

5. MALR DATA COLLECTION SYSTEM

The Study of data availability by Morsy, et al (1999) contained a detailed description of the various entities involved in collecting agricultural data in Nile valley governorates. For the most part the same entities collect data on the New Lands, often not separating them from the old lands. This section provides a brief summary of those entities for the convenience of the reader.

5.1 Major Collection Entities And Sources

Ministry of Water Resources and Irrigation (MWRI): This ministry was previously named: Ministry of Public Works and Water Resources (MPWWR). In coordination with the Ministry of New Urban Communities (MNUC), the MWRI makes the plans for all irrigation canals and pumping stations for the newly reclaimed lands. Data on area served by each pumping station and the power of each are available in that ministry. By virtually any definition New Lands include all of these areas.

The Egyptian Survey Authority (ESA) of MWRI: This authority is responsible for area statistics for major field crops in the agricultural sector. These are the areas which are taxed based on their cultivated area in certain crops. In the agricultural sector, ESA measures cotton and wheat area by means of an annual 50%[2] sample of all cotton and wheat producing areas. It reports their estimates to EAS in MALR, which uses them to flag outliers in EAS data. These data are not published, and the entity is outside of the range of authority of MALR. The ESA does not collect area data for the New Lands regularly.

The Central Agency for Public Mobilization and Statistics (CAPMAS): This agency publishes statistics on cultivated lands and their changes over the years. It publishes data on lands reclaimed, lands turned into utilities and fallow lands. It also publishes data on land by type of irrigation and drainage. Their data is usually very difficult to get, even if it has been published. It would not be wise to be dependent on CAPMAS for data on the New Lands.

General Authority for Reclamation Projects and Agricultural Development (GARPAD): This authority is now under MALR. It has responsibility for carrying out all the activities of land reclamation in coordination with MWRI. GARPAD makes all the plans for areas, locations, and timing of land reclamation activities. All data on costs of developing irrigation infrastructure, different areas reclaimed and the distribution of new lands according to the major types of holders (beneficiaries, small investors, graduates, and big investors) are available at this authority. Data on reclamation costs, including land leveling, irrigation canals, pumping stations, farm size and all other infrastructure costs are considered to be accurate due to the availability of records of expenditures for the different institutions performing any activity in land reclamation.

Central Administration for Agricultural Economics (CAAE): The CAAE is under the Economic Affairs Sector of MALR and includes the General Directorate for Agriculture Statistics (GDAS), the General

[2] This 50% is according to ESA.

Directorate of Food Security, and the General Directorate for the Agricultural Census (GDAC). The CAAE has responsibility for collecting, tabulating, and publishing all data related to agricultural production. This department publishes two semi-annual reports, one for the winter season and the other for the summer season, but mainly for the old land.

CAAE reports contain data on annual area cultivated and annual cropping patterns, but they are not broken down in a way as to provide good data on the New Lands. Time series data on area, covering beneficiaries, small investors and graduates, are available since 1993 as they are the basis for receiving farm inputs. Such data can be considered reliable as far as they go, but by no means include all New Land area. Similar data for big investors are not reported regularly, only in certain studies at specific periods. Squatters are not covered at all. Since 1997, CAAE has been estimating production and yields for Noubaria, and since 1998, for all other governorates.

The General Directorate for Food Security is responsible for reporting data relating to commercial farms which have received subsidized loans at one time or another. Like the GDAS, it does not actually collect data itself; it reports on data collected by the various administrations of the Animal Production Sector and the extension service.

The General Directorate for the Agricultural Census prepares, conducts and analyzes the agricultural census. It is in the process of conducting the year 2000 census. Field data collection for the main phase will begin in November, 2000. This will be the first year the census breaks out New Lands as a category.

The General Directorate for Agricultural Statistics is responsible for producing the annual statistics reports for the technical services of MALR that are published by CAAE. The GDAS does not really collect much primary data; mostly it only gathers for publishing data collected by the central administrations of the technical sectors such as the Animal Production Development Sector, the Agricultural Extension Sector (does not include livestock), the Land Reclamation Sector, and the Agricultural Services Sector. The primary data are gathered by extension agents, supplemented by estimates provided by the various technical officers at both the district and the governorate level.

GDAS also has data on marketable surplus, marketing channels, and farm-gate prices for important agricultural commodities. Such data are collected on an occasional basis for specific studies in certain regions of the new lands. There is no specific program for collecting such data on a regular basis. This creates great difficulties for making detailed or accurate analyses using these data.

The Sampling Directorate is a division of the GDAS that does actually collect data. It is responsible for making objective yield estimates via crop cutting surveys for a few strategic crops, mostly field crops, in order to develop reliable estimates of production using the area data gathered by extension agents. However, crop cutting surveys are rarely done in the new lands, except for specific crops or areas on an ad hoc basis. As a result, the data for the New Lands are highly unreliable. Yields on the New Lands are mostly derived from area and production estimates.

Central Administration for Horticulture (CAH): This administration has technical responsibility for horticultural crops. CAH is responsible for collecting data on area, production and yield of horticultural crops. Data are available for each governorate in Lower, Middle and Upper Egypt, as well as for out-of-valley governorates. Available data include production of winter crops, permanent crops, summer crops and Nili crops, as well as total cultivated areas and fruitful area, by crop. As is the case with GDAS horticultural data, which comes from the CAH, these data are only partial and do not include large investors, squatters and many small investors.

For the last two years there has been good coordination between this administration and GDAS in order to unify all the data concerning horticultural crops. The CAH has more detailed and complete data than that published by GDAS. This office is very open and willing to share whatever it has.

Animal Production Sector (APS): This sector was previously called Central Administration of Animal Production (CAAP), which is also part of MALR, attached to the Animal Production Development Sector. It has technical responsibility for livestock production. It collects data on livestock through the livestock extension agents at the local level. It has data on livestock numbers, livestock production and some on cost of production. The data are published by the EAS in two publications. One is titled "Statistics of Animal, Poultry and Fishery Wealth" and the other is titled "The Annual Report on Food Security Projects".

Food security projects are those commercial farms which received subsidized loans during the seventies and eighties. These data supposedly concentrate on commercial farms, though for milk production, at least, the data seem to include all small holder milk production in a category called "projects of less than 35 feddans". The food security report also contains data on greenhouses and vegetable production by commercial farms, although it was not able to determine how complete these data are. In both volumes, information on number, type and species of animals are obtained from the Animal Production Sector, while information on slaughter houses, number of slaughters, meat and milk production are obtained from the General Organization of Veterinary Services (GOVS).

Mubarak Young Graduates Project: The Mubarak Graduates Project runs its own extension service, paralleling that of the Agricultural Extension and the Animal Production Development Sectors. It is represented at the governorate level through 18 Development Supervisories, all headed by a General Supervisory currently based in Noubaria. Like MALR, it collects data on area and production through its extension agents, and reports this data up through the Development Supervisories to the General Supervisory. Presumably, its data collection and reporting procedures follow those of the MALR extension service, but it was not possible to verify this in the study work because of instructions to field staff that we should get all data from the General Supervisory. For this entity, there is a limited information on data reporting and quality.

The Graduates Project collects data on area cultivated and production, by crop, livestock numbers and other information on the graduates, social beneficiaries and small investors under its responsibility. It reports these data To the GDAS on an annual rather than on a seasonal basis, and on the basis of Graduate Project Supervisories rather than by governorate, and so do not cover the same area as data

from the governorates. The team was not aware of any breakdown by type of holder or by governorate made by the Graduates Project for the data it sends to GDAS.

The structure of MALR, from the sector to the Central Administration level, as it pertains to the sectors of importance to this study, are described in an organigram on the next page. The organigram includes the new location of GARPAD and the Mubarak Graduates project, as well as the governorate agricultural administrations.

5.2 The Systems for Collecting Data on the New Lands

There are four separate systems for collecting data on the New Lands in MALR: the agricultural census for basic statistics, a crop cutting survey for estimating yields, the extension service for current administrative statistics on Nile valley lands, and the Graduates Project for the portion of New Lands under its supervision. In theory, the first three treat new lands pretty much the same as Nile valley lands. In most cases which was examined by the team, the agricultural districts are collecting some, but not all of current statistics on the New Lands under the authority of the Graduates project. The project does that itself.

Egypt uses an administrative system for collecting most of its current agricultural statistics on the New Lands. Agricultural data are collected on farmers (not always from farmers) by extension agents and cooperative managers at the village or cooperative level. In theory every part of the Nile valley is covered by an agent, but large New Lands areas are not yet covered by extension agents or cooperatives. Data gathered by the extension agents and cooperative managers then get aggregated and verified at the village or cooperative level before passing up to the district level for those areas covered by the district agricultural office, or to the supervisory level for areas covered by the Graduates Project. From there they get checked, verified and perhaps massaged a bit, before being passed up to the governorate level or, in the case of graduates, to the general supervisory level. At each level data are reviewed, verified and, if necessary, recollected before being passed to the next highest level.

The system for collecting livestock data is similar, except the livestock extension agents are much fewer in number, even in the Nile Valley, and the major data collection effort is a livestock census every two years. The district livestock officer directs this effort, and uses the extension agents of the Agricultural Services Sector to supplement those of the Animal Production Development Sector. According to the responses of the livestock officers to the administrative questionnaire, it appears that some of them also collect data from farmers.

Data on the graduates get aggregated with data on the rest of the governorate for the first time at the governorate level, but not on a consistent basis. Some governorates report receiving the data, but others indicate they are not successful in obtaining them. There is no formal requirement for the Graduates Project to supply data aggregated on the governorate level to the governorates themselves.

Figure 1: Organizational Structure of the MALR (October 1997)

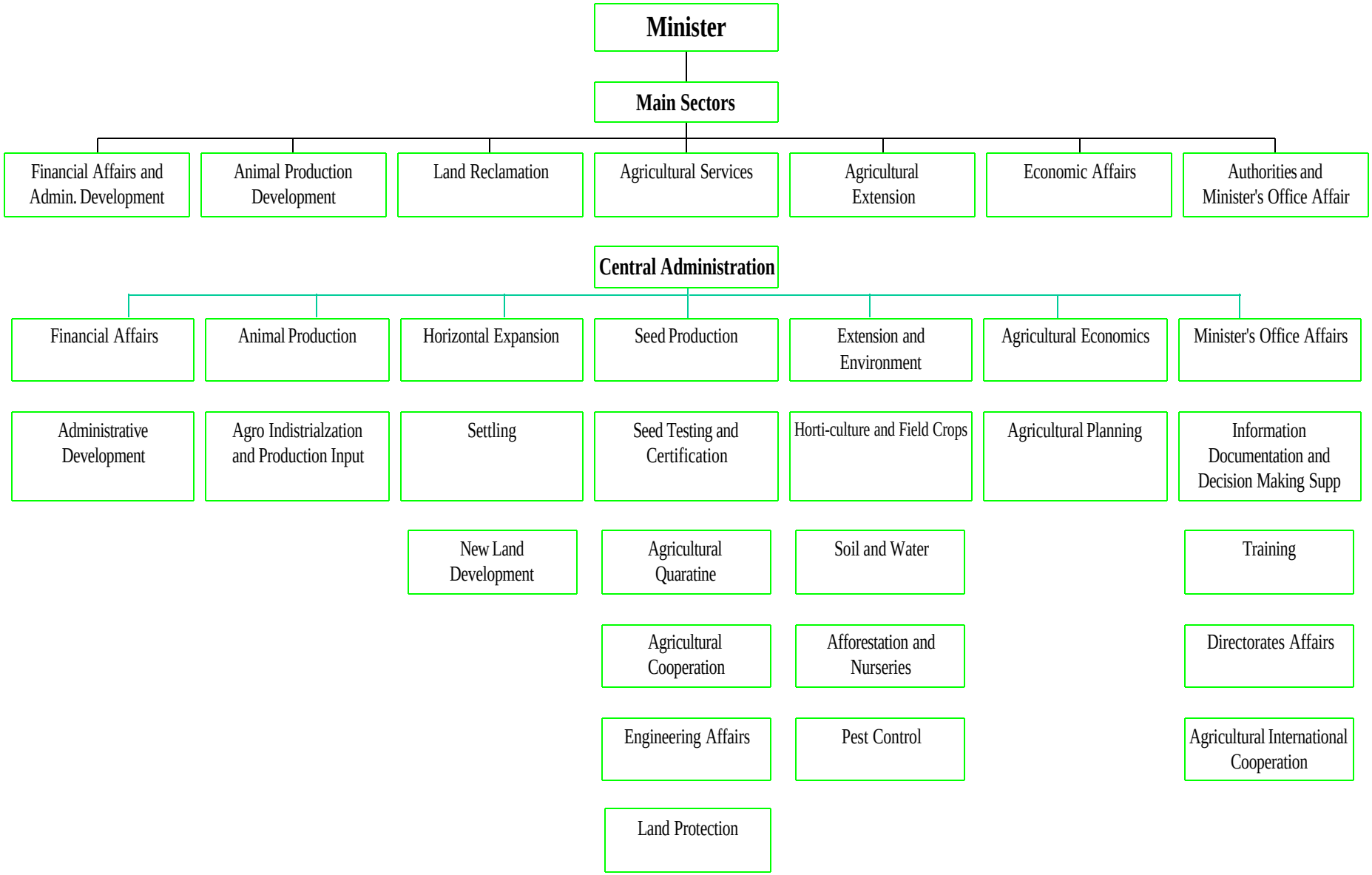
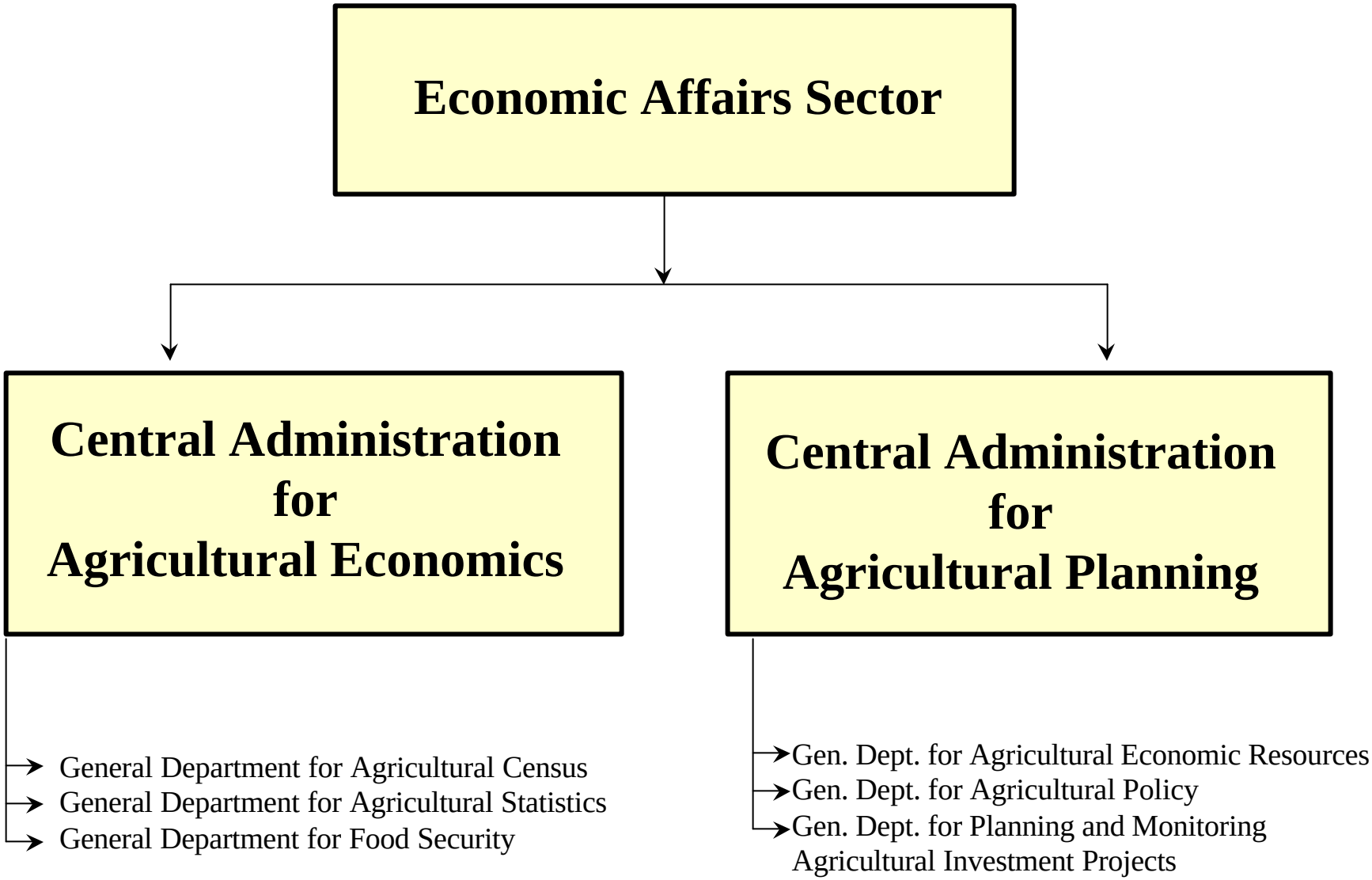


Figure 2: Organizational Structure of the Economic Affairs Sector



This is how the system works in theory. The cooperative managers and extension agents are probably the most important links in this chain. They have to make many decisions that greatly affect the quality of data, often without much guidance. They have the first contact with the data. Everything after that is aggregation and juggling. If these officers aggregate data before reporting them, which they normally do, important details are lost and there is no way to retrieve them without returning to the village. This is where the study begins the review of data on the New Lands.

5.3 How Well Is The System Working?

Although both MWRI and CAPMAS collect data on agricultural area and production, their separate line of authority and very different goals make reliance on them for high quality current agricultural statistics out of the question. The MALR has ample human resources to produce quality statistics on its own. The following sections examine each of the components of the data collection and reporting chain in more depth.

5.3.1 Current Administrative Statistics

One of the problems with administrative statistics is that they are only as good as the coverage of administrative areas for which they report. If coverage is relatively complete and collection is serious, they give more accurate results at lower administrative levels without sacrificing a lot of accuracy at higher levels. If coverage is not complete, then sampling with professional enumerators will usually provide more accurate data at the higher levels of aggregation, but less accurate data at lower levels. Egypt faces the choice of which direction to take to improve the quality of agricultural data pertaining to the New Lands.

The field work shows that some reclaimed or New Land areas in the Nile valley fall outside of existing administrative areas, i.e., there are parts of some governorates that are not in any statistical unit. This was found in the visit to Fayoum, one of two Nile valley governorates included in this study. Some governorates, such as Ismailia, have been more aggressive in incorporating New Lands into their statistical coverage. Fayoum, on the other hand, is moving slowly. Of course, governorates outside of the Nile valley don't have to do anything special under the current system, all land is considered New Land, whether it has been reclaimed or not. There is, however, still the issue of completeness of coverage: are they collecting data on all of the reclaimed areas added over the past decade or more? The study team doesn't think so.

The following is a summery for the results of the questionnaires administered to personnel involved in the collection of current statistics. Annex C contains more details on the questionnaires applied in the survey. Some other observations pertaining to the quality of the data collection effort at each level are also included.

Extension Agents. The interviews of the 19 extension agents in this survey showed that 14, or over 70%, do not get the office supples they need to do their work. Nearly all (18) carry a notebook which they use to record agricultural data. Most record area (17 for field crops and 14 each for fruits and

vegetables) , and about half record production, yield and livestock numbers. Only three measured fields. The interviewers commented that the quality of notebook entries was high.

Initially, only 11 (58%) agents reported that they record data at the farm level. When the team probed for details of the data they enter into their notebooks, however, 18 (95%) said they get their data directly from the farmer. Only half of those attempt to verify the accuracy of the data by visiting the farm. It would seem, therefore, that recording data at the farm level was interpreted as visiting the farm to get data, as opposed to asking the farmer for the data at some other location. This means that in the tremendous majority of cases the data come directly from the farmer, an indicator of good quality.

When asked how they choose farmers on whom to gather data directly, 11 (61%) of the eighteen who do this said they visit and select few, eight by selecting some with a good crop and some with a less good crop, and two by selecting those who are generally cooperative in giving data. Only two reported using a formal sample. In theory, they are supposed to get data on all farmers, not just a sample, at least for area in specific crops.

All of the agents transfer at least some of the data they collect to the district or supervisory level, but only seven transfer all of them. Sixteen of 18 (89%) keep a copy of the data they send to the next level. When asked about problems they face, two thirds (12) mentioned too much work or insufficient staff, and 14 (78%) mentioned lack of transportation or fuel. Only one indicated that additional training is a solution to the problems he experienced.

Cooperative Managers. All but two cooperative managers send data to a higher level. The source of the data is usually the extension agent, 16 of 19 (94%) for field crop and vegetable crop data. Three managers got their data from the farmer, one (6%) by direct measurement. For fruits and livestock about 85% got their data from the extension agent.

Fifteen of the 18 (83%) managers review the data they get from the extension agents and go back to the farmer if they find inconsistences. Only 13 of 18 (72%) review the extension agents' notebook, the rest feeling this is not their right because they consider the books to be the private property of the agents. Almost all of those who do review the notebooks check them against the cooperative's records and enter comments in the books.

All of the 18 managers who send data on New Lands to the district said that they do so in a format of their own choosing. All keep carbon copies of any data they send.

Problems affecting managers in their work for the most part concerned staffing (reported by 15 of 19 agents or 79%) and transportation (12 or 63%). Inadequate workplace, inadequate incentives and farmers' problems received six citations each (32%). Only three managers (16%) reported lack of training as being a problem that affects their performance.

District Statisticians. The study team collected data from 11 district statisticians, only seven said they request separate data for New Lands. All but one of those requesting separate data reported receiving

them. Nine of ten felt that they and their subordinates used the same definition for New Lands, i.e. lands recently reclaimed and cultivated.

All but one collect area, yield and production for field crops, nine for vegetables and seven collect area, production and yield data for fruits. About half of the officers get cost of production and prices for field crops and vegetables, but only two do so for fruits. All eleven get their data either from the extension agents (10) or the cooperative manager (1). Only three gather data on livestock. Eight of the 11 report that they verify the data they receive.

The study team was informed that it is the head of agricultural administration, not the statistician himself (in four out of five cases) that determines sample size and the sample units when a sample is drawn. Surprisingly, only five of the eleven district statisticians had received formal training in statistics or sampling.

Governorate Statisticians. Five Governorate Statistics officers were interviewed. In Noubaria, North Sinai and Ismailia the statisticians consider themselves to be responsible for all New Lands in their Governorate. In Fayoum and New Valley they consider themselves responsible for only about one-third. It is significant that two of the five officers indicated that there is no agreed upon definition of New Lands between themselves and their subordinates, while the five governorate statisticians shared four different definitions of New Lands between them.

The governorate statisticians report collecting more types of data than the district statisticians report, probably because they have better luck getting data from the Graduates Supervisories. The questions did not probe the completeness of data collection since the team was not aware of the problem of incompleteness that exists with non-graduate data when the questionnaires were drawn up. It is very possible that the question was interpreted as getting any data at all. Had the team known at the beginning what is known now, the team would have focused on completeness of geographical coverage as well as on type of data. In general, field crops get more attention than vegetables and fruits.

Governorate statisticians obtained their crop data on new lands from the district officers and, in Nubaria, from the Graduates project. In Sinai, the statistician reports using forms prepared by MALR to collect data from the districts; everywhere else they either use a format developed themselves or get the data in various formats from the districts. Four of the five collect livestock data, all from the livestock administration at either the governorate or the district level. Two of the five respondents indicated they have to make a special effort to get data for new lands supervised by the Graduates Project. In Nubaria, this means writing letters to the supervisories and to large investors; in the New Valley it means keeping after the supervisories to get data on the graduates, usually to no avail. Suggestions for resolving the difficulties included establishing a system for cooperating with the supervisories and unifying data gathering organizations.

Only two of the five officers reported doing any verification of the data they obtain, and only one performs any kind of statistical anlysis in his office. Only two of the five report data on the New Lands separately, the three not doing so indicating that all of the land in their governorate was of the same type (Sinai, Fayoum and New Valley).

In terms of time series and level of data available at the governorate level, all had data series of five or more years for field crops, five had three or more years for horticultural crops, and two had five or more years for livestock. All had data at the district level. In looking at independence and control issues, two of the five said they sometimes get a request to modify their data to fit with plan objectives or figures from other governorates; three said it rarely happens.

When it comes to drawing a sample two of the five do it themselves, one gets help from the Sampling Office and one gets help from the ministry. Responses to a question on the sample frame used for estimating cost of production indicate that non-sampling procedures only are used. All the officers had a B.Sc. in Agriculture, two had training in statistics and two had training in sampling; one had training in both; so two of the five had no training in statistics or sampling.

When prompted for problems facing them in their work most reported transportation, staffing and workplace supply problems, the same problems reported by virtually everyone interviewed at the District and governorate levels. Resolving these problems will be critical if MALR wants to improve the quality of its data at any level.

Sampling Officers. Of all persons working in different statistical offices, the sampling officers are probably the most technical, they have clearly established goals and procedures. They collect data themselves and do not just rely on someone else to provide them with the data they are required to get. They do, however, rely on the agricultural administration for crop area data and on the ESA for verification of these data. In all the seven sampling officers interviewed by the team, five at the governorate level and two at the district level, all officers described what they do in a way that indicates a clear understanding of their work.

Except in north Sinai and Ismailia, the sampling offices use yield data together with crop areas to obtain estimates of production for crops sampled. In general, yield estimates are obtained by district, except in Fayoum, where the district officers produce yield estimates for the villages as well. To calculate production from yield data, all said that they use simple arithmetic means.

In Fayoum, where there are sampling offices in the districts, the district sampling officers obtain crop area data from the district agricultural administration. In New Valley, Ismailia, and North Sinai, they get these data from the agricultural department at the governorate. In Noubaria the officer said that he got these data from young graduates supervisories. Most of the governorate sampling officers believe that crop area data they get are not accurate and suggest that the sampling office estimate area directly from the fields.

All officers said that the sample size they use to measure yields is determined by the sampling administration at the MALR. They may have input in this decision because the sampling administration allows them to increase the number of crop cuttings performed in some locations to increase accuracy.

Five out of the seven officers interviewed said that they collect data from the New Lands but none of them report it separately, except for Noubaria where all land is considered New Lands. At the

governorate level, three out of five offices reported reviewing the data before sending them to GDAS.

In describing difficulties preventing the sampling officers from obtaining good data all administrative difficulties cited have to do with size of staff, transportation, and lack of cooperation from the supervisories. As for the technical difficulties, there is concern that current staff may not be well trained enough for the new responsibilities. Only three officers out of seven participated in statistical training programs in the last three years. Only one officer in Fayoum has a computer in his office and he said that he uses it frequently in his work.

Horticultural Officers. The reporting chain for horticultural crops appears to be from extension agent to the district agricultural office to the district horticultural officer and from the agricultural affairs office to the governorate horticultural office. From that point it goes from the horticultural officer to the Central Administration for Horticulture. From there it goes to the GDAS for publishing. The data for horticulture are reputed to be among the best data available for the New Lands, field crop data being not so good. This is truly bizarre since our own analysis indicates that none of the fruit or vegetable area in old valley governorates is making it into the official statistics reports as New Land production (See section 6.3.).

In the study survey, 15 horticultural officers were interviewed, five at the governorate level and ten at the district level. Only three have any training in sampling methods or analysis of agricultural data; twelve feel a need for more training in statistics.

Twelve of the fourteen respondents felt they and their subordinates used the same definition of New Lands. Those who don't, both at the district level, said they just accept the difference; presumably everyone just reports according to their own definition.

Almost everyone reports getting their data on area from the agricultural administration. Eighty percent or more get their yield and production data from there as well.

Livestock Officers. In spite of the generally lower level of coverage at the local level by livestock extension agents, only one-quarter (3 out of 11) of the livestock officers we interviewed reported that their work load was too heavy. Two thirds (10 of 16) said they need more training in sampling or statistics.

The livestock officers appeared to be a bit less knowledgeable about the area in New Lands that is under their jurisdiction than do the other officers, six of 11 (55%) reporting that they did not know. A common defense was that the nature of their work does not tie them to a fixed area.

For data, responses at the district level were fairly uniform. All report on livestock numbers, but none gather cost of production data. Six get their data from the cooperative manager, three from the bi-annual livestock census (which is executed by the cooperative mangers and extension agents), and one reports getting it himself, presumably directly from farmers. Three out of seven (43%) answering the question said they had difficulty getting livestock data from the graduate Supervisories. These difficulties

can be solved, in their opinion, by establishing a system of cooperation with the Supervisories and by solving transportation problems.

As far as reporting data on the New Lands, six of nine (67%) at the district level said they report data on new and old lands separately, but all governorate livestock officers said they themselves do not. Seven of nine agents who said they keep records of the data they send to the governorate have time series of four years or longer; one has 28 years of data. Apparently the length of time series is dependent on the length of time the agent is in his position. This suggests there is no institutional storage of data at the district or the governorate level. Seven said they verify part of the data at its source before they send it.

Summary for Current Statistics. The responses to this set of questionnaires directed at the administrative statistics program pretty much confirms the findings of Morsy et al. (1999) in their study of the Nile valley governorates, at least for those areas covered by extension agents or cooperatives. Data collected by extension agents and cooperative managers at the level of the farmer, especially area cultivated, do not appear to be too bad. This conclusion is not as strong as it could have been had it been possible to interview farmers without extension agents present, to see if the agents really deal directly with farmers as much as they say they do. But it is logical given the quality of the notebooks observed by interviewers. However, there is still the problem of much lower coverage of New Lands areas by extension agents and cooperatives.

At the next level, the district, most officials readily admit that what data they collect from farmers on costs of production and prices is gathered from a judgement mix of good, and some not so good, farmers. A few pick cooperative farmers. In any case the samples are no doubt small, since this is what the ministry tells them to do, and they do not appear to have adequate resources at this level for anything else. For small sample sizes there is probably not a lot of difference in the reliability of estimates between an actual random sample and what they are doing now; both need to be tempered with some judgement about what is reasonable.

The anecdotal and sparse data obtained suggest that, as the New Lands data move up the chain of command, unlike data from Nile valley governorates, they do not acquire an upward bias. Some values are higher and some are lower, and there are a few more higher than lower ones between the district level and the governorate level, but the number of data points are too few to draw any statistical significance from the results. If anything, there is probably a downward bias arising from the substantially weaker extension presence in the New Lands, almost certainly resulting in less complete coverage. Another problem encountered in some governorates was getting different answers from different officials to a question on the amount of New Lands in the governorate.

For all livestock, the service does not separate data on the old and new lands. Commercial poultry farms require a license to operate. So the Central Administration for Animal Production knows who they are and where they are, and could provide a breakdown if requested. The livestock service indicated its willingness to begin reporting livestock data separately for the New Lands if asked to do so. Apparently, this has not yet occurred.

5.3.2 Crop Cutting Surveys

The Directorate of Sampling (DS) designs and conducts crop cutting surveys each season to estimate yield, or sometimes acreage under a particular crop for an area where confirmation of ESA' area estimate is needed. Until now its activities have been concentrated on just a few strategic crops in the old lands, with only occasional crop cutting surveys being carried out on the New Lands, mainly for one time studies. The directorate also uses crop cutting sampling procedures to estimate potato production and tomato production in the larger producing governorates. DS makes estimates for the three cropping seasons: winter, summer and Nili. Crop cutting surveys have been used in Egypt since 1955. The DS has done very little objective yield work on fruits because of the frequent harvests involved and the Directorate's limited resources.

The sampling procedure used by the DS may involve one, two, or more stages depending upon whether the area is to be covered intensively, or a small sample is being drawn from a large area. In crop cutting surveys, information is obtained by direct observation and measurement, without depending on responses from the operator of the holding. For this reason, their estimates of yield are usually referred to as objective yield estimates. Response errors may be reduced considerably by such methods since they do not depend on the operator's knowledge or memory.

To gather its yield estimates, the Sampling Office uses a stratified multi-stage sampling procedure. Each governorate is a different population and not a different stratum. Each governorate is divided into strata. At the first stage a stratum is either a district or part of a district. Each district is then divided into sub-stratum based on when the tile drainage were installed. According to the Sampling Office, there could be as many as 40 different drain tile strata in a single district.

The procedures for drawing the samples and placing the yield plots are quite detailed and are described in Annex D. The number of crop cutting plots is determined based on the level of accuracy desired for the estimator, and the variance found in the sample population in the previous year. The plot is harvested according to preset plans and weighed. The yield in a stratum is calculated as the arithmetic mean of experiments within groups.

The yield estimates are usually checked against estimates of yield obtained through the extension agents and other agricultural officers. If the figures do not match, which is often, a high level committee irons out the differences. This leads to subjective estimates which compromises most of the benefit of the crop cutting experiments.

It is a different story in the new lands. For one thing, dividing agriculture land into hodes[3] is not the practice except for one or two locations. Furthermore, the lands are not contiguous and may be better associated with wells or some other identifying characteristic.

Because of its experience, disciplined procedures and demonstrated rigor, and the higher level of training of its staff in the governorates, it is believed that the Sampling Directorate is a logical choice for

[3]A Hode is a section of land that includes a number of farms.

beginning to develop a reliable set of statistics on the New Lands, using scientific sampling techniques. The office is just now reviewing its entire sampling strategy. A major funding source that wanted fine levels of stratification by drainage system and time since establishment, is no longer providing the same level of funding. This frees the Directorate to move toward a system that should be able to produce the same level of precision with a smaller sample size, by utilizing four to six strata within a single governorate, instead of 40 or more. The Head of Sampling indicated that it is not yet decided on other types of classification for the strata, so this is an excellent time to give serious consideration to expanding the role of this directorate. It can provide current estimates of both area and yield of important crops as the primary data collection system for current statistics in the New Lands. Eventually, the system could be used to estimate area and yield in the old lands too.

In the New Lands, efficient sampling will require stratifying first stage sampling units, such as census reporting clusters. Initially these strata may consist only of geographical areas, until the area cultivated and the types of farmers cultivating it can be more precisely defined for each one. Eventually, the sampling frame could stratify all cultivated area into four user strata: graduates and beneficiaries, small investors, large investors and squatters, two or three strata relating to time since first cultivated, and two or three relating to irrigation system or water source. The large investor strata may have to be divided into two sub-strata, one covering those who agree to provide data and one covering the rest, but there is no concrete evidence of the need for this at this time. A separate stratum for squatters appears necessary because this is a sizable population in some Governorates and it will require special enumeration techniques to develop estimates for this stratum.

5.3.3 Agricultural Census

The agricultural census is currently in process in Egypt, with actual data collection scheduled to begin in November, 2000. The agricultural census covers all land falling within the domain (zimam), that is cultivated, fallow or used for utilities, as well as land outside the domain like the Oasis, Natroun valley or north coast. One of the most important aspects in the census is the enumeration of all holdings. A holding is any piece of land used completely or partially by the holder whether he owns it, rents it or otherwise, and whether it was cultivated with field crops or horticulture. It may even contain green lands, swamps or be fallow. A holding does not include reclaimed land that has not yet been cultivated.

Because of the definition of holding being used by the census, the census can be used to determine the amount of land reclaimed by GARPAD that is actually being cultivated. All that would be required would be to prepare the sampling frame described in section 8.1.2., and then calculate the total area cultivated within it, based on the census results for those clusters.

The agricultural census is carried out according to international agreements which indicate that it should include at least the following items: The holder, the size of holding, the type of tenure, crops, agricultural workers, data related to irrigation and drainage, use of fertilizers and pesticides, use of agricultural machinery, and consumption of fuels and energy.

Because this study is concerned with data on the New Lands, and the last census did not report data on the New Lands separately, the study did not focuses on evaluating how well it is collecting data. However, the rigor and procedures that the GDAC has put into place to carry out its work, as well as the knowledge of important census methodological issues they exhibited are very impressive. As noted previously, the main short-run contribution of the GDAC to the current statistics program of MALR would be to provide the information to construct a sampling frame.

5.3.4 The Mubarak Graduates Project

Unlike the other three systems for collecting agricultural data, the Mubarak Graduates Project collects only data relating to New Lands. It has no responsibilities for unreclaimed lands, although some of the reclaimed land for which it is responsible falls within the Nile valley and within lands officially classified as old lands. As mentioned previously, it was not possible to judge the quality of agricultural data provided by the Graduates Project because of the inability to get access to them at the lower levels where they are, in theory, collected.

Both GARPAD and the Graduates Project were, until recently, outside of MALR. Since becoming part of MALR they have remained mostly independent of both the technical and administrative central administrations and their representatives at all levels. They report data on their activities and the farmers they serve directly to the Minister. As a matter of course, GARPAD and the Graduates Project formally share little data with the Agricultural Affairs Offices in the governorates or districts, though some of the governorate officers are able to get the detailed data informally.

Many of the problems with data coverage on New Lands arise from a lack of coordination and cooperation between the Graduates Project, GARPAD and the technical sectors of the MALR at the governorate level. Hopefully, making them both part of MALR will make the task of coordinating data collection and reporting activities between them and the technical services, for the purpose of collecting quality data on the New Lands, a bit easier in the future. Indeed, there have been several meetings at the Central Administration level to discuss coordination among the various administrations. Recently they have begun working together at the national level to allocate the graduates data to the different governorates. This breakdown will then be communicated to the governorate agricultural affairs offices.

5.4 Summary of Overall Data Collection System

From this discussion it is clear that Egypt uses a combination of statistical and administrative approaches to collect agricultural data. Some of these appear to produce better data than others. With the exception of the Graduates Program, all of the approaches have, historically, given little attention to collecting data on the New Lands as a separate class. As the various systems have been expanded to include New Lands there is a lack of clear agreement on how to define New Lands. This appears to affect what data are reported for the New Lands by the participants of the various systems.

The smart strategy, in the team opinion, is first, to undertake to define, by location, the exact reclaimed areas to be included in New Lands in each governorate, and second, to build on the strengths of the better and lower cost data collection systems, in order to build up a reliable and accurate data base on

the New Lands. At this juncture such approach would utilize the agricultural census reporting clusters to build a stratified sampling frame of New Land areas. It would expand the role of the Sampling Directorate as the primary office responsible for estimating area and yield and cost of production for economically important crops in the New Lands. And it would create a coordinating committee at the governorate level for gathering and reporting on area and production for all reclaimed land in the governorate.

6. ANALYSIS OF EXISTING PROCEDURES

One can tell a lot about the likely quality of data by analyzing the procedures established for collecting, tabulating and presenting and publishing them. If there are no established procedures, or clear explanations given for the purpose of each question, then it can be assured that data are not good quality. Good quality data depends more on ensuring that everyone has the same understanding of what is supposed to happen and what each question means, than on the experience of the enumerators. The purpose of a procedures manual is to ensure that everyone has that same understanding. Otherwise each enumerator is, in effect, asking different questions.

In a high quality data system, there is always some disagreement on particular procedures, but the general thrust is coherent, predictable, disciplined, transparent and well documented. Statistics publications should explain most questions likely to be raised by users, and document the treatment of issues on which there may be disagreement or where different researchers may wish to treat the data differently. They should always include a discussion of methodology. Indeed, the absence of a discussion of methodology is the hallmark of low quality data collection and publication programs. The fact that the study makes a special effort to get much of the information in this section creates a professional presumption of low quality. The following is a more close explanation to see if this presumption is warranted in the case of MALR published and unpublished data as it pertains to the New Lands..

6.1 Data Collection

The overriding issue with respect to data collection for New Lands is the absence of sufficient coordination at the governorate level by the various entities responsible for gathering agricultural and livestock data. The separate collection and reporting of agricultural data by the Graduates Project is an environment ripe for incomplete coverage, double counting, aggregation errors and reporting embarrassments. This coordination can only be done effectively at the governorate level, where there is more familiarity with reclamation activity in the governorate, where reference can be made to specific geographical areas; and, where there is greater likelihood that all important persons can be made to share the same vision, definitions and approach. The Mubarak project supervisories can still report their data to the General Supervisory, but they should only do this after a coordinating committee at the governorate level has determined what area the data cover, and what area remains to be covered. Of course, there are many issues of definition, coordination and approach to collecting data that these committees will need to decide. Hopefully they will be guided in this effort by nationwide guidelines established by the MALR, in conjunction with the governorate Statistics and Sampling officers.

6.1.1 Agricultural Data

Each cooperative has a large printed book provided by MALR for the extension agent and cooperative manager to record the area and production for each crop for each farmer in the village. The books also record input use and livestock numbers. The books are arranged in a way that facilitates manual tabulation of the crop specific data required to be reported to the district agricultural affairs officer. In

general, the state of these books was found to be good, though there were cases where there is little evidence of recent activity.

The extension agents and cooperative managers do not, as a matter of course, estimate yields. About half record information on yields and production, but a smaller proportion send those data to the district. There is no consistent format for reporting these data as they pass up, through the district to the governorate, and on to the MALR in Cairo.

In contrast to area and production data, there are fairly detailed written procedures for how to collect cost of production data. However, the instructions leave many important questions unanswered. In spite of their apparent detail, they do not suggest procedures that are specific enough, or sample sizes large enough to provide a more reliable estimate of average yields or average costs than would a good judgement by an experienced agricultural agent. For example, the instructions for field crops suggest dividing holdings into less than three feddans (less than one feddan for horticultural crops), 3-5 feddans (one to five feddans for horticultural crops), and more than five feddans. Then two farmers (3-4 for horticultural crops) are to be picked at random from each of the two smaller strata and one (three for horticultural crops) from the larger one, for a total of five (ten for horticultural crops). The simple arithmetic mean of these five (ten for horticultural crops) observations is to be the mean value for the district. The district mean is then weighted by the area in each district to get the average for the governorate.

There is no mention of how to create the list of farmers stratified by size, or how to draw the sample from the list, except that it should be random; or how to pick a field to cover if a farmer has more than one. Can you imagine anyone going to this much trouble for an entire district, for each crop, only to draw a sample of five? The bottom line, of course, is that most officers do not, and they do not try to hide that fact. Even if the statisticians wanted to follow these instructions, they do not appear to have the resources to do so.

6.1.2 Livestock Data

Apart from the description of data collection procedures given to the team by the District and governorate livestock officials, and the reasonableness of published data, there is not a lot to go on for evaluating the quality of available data on livestock. What evidence there is suggested that livestock data, as they can be made to relate to the New Lands, are not very good.

Data on livestock are not collected with separate reporting for New Lands in mind. Neither of the two main volumes reporting livestock statistics separate new lands from the valley except crudely, by location of the governorate. The term new and desert land is applied to North Sinai, South Sinai, Mersa Matrouh, Red Sea, New Valley and Noubaria. There are no reported livestock data for new lands in the rest of the country, not even for the Graduates Project. Information on New Lands is either included in data on the Nile valley governorates, or is not collected. Moreover, the majority of animal production officials at the governorate level are reluctant to report separately on the New Lands because of a lack of facilities, manpower, transportation, and motivation for both the farmer and the officer.

Worldwide, information on livestock is comparatively difficult to collect. Only in a few developed countries where animal products represent a substantial proportion of the GDI, are statistics on livestock reliable. In Egypt, the situation is more difficult, especially in the New Lands. Herds and flocks of small ruminants are constantly moving in search of crop residue and stubble for grazing. A settled farmer who keeps 2-3 head of cattle or buffalo fears envy and evil eyes, and is reluctant to give correct information. Farmers need to be motivated to give information by providing them with incentives such as technical advice and veterinary services. Even with that, and with a good sampling methodology, good quality data is by no means assured, with the possible exception of the larger scale commercial sector.

To anyone who is familiar with livestock in Egypt, the published data clearly over estimate the number of livestock in the Red Sea governorate and under estimate it in Noubaria region (see Table 6-1).

Table 6-1: Numbers Of Livestock In Noubaria And Red Sea, 1998

Governorate	Small Ruminants	Camels	Draft
Nubaria	43000	90	2017
Red Sea	212000	44000	3500

Source: Statistics of Animals, Poultry and Fishery Wealth, 1999, p.2.

The total number of camels reported for the country in the same publication (136,000) is clearly under estimated. Two governorates; Qena and Sharkia are well known for their high reliance on camels for both transportation and meat. In Qena, farmers use camels to transport sugarcane from field to processing plant. In some districts of Sharkia, camel meat is favored. The data show only 6000 camels in Qena and 3000 camels in Sharkia. In Noubaria, the reported total number of camels for the entire area is only 90, while one of the authors personally knows a farmer who is keeping more than 100 camels.

For cattle, it is difficult for non-specialists to distinguish between pure exotic and cross animals. It makes more sense to combine the two into a single category. Is it possible that there are no baladi cattle in all of North Sinai (Table 6-2).

It is suggested that the livestock service gather less information with greater accuracy by phasing in more rigorous data collecting procedures. In particular, there is a need for more coordination among different projects and institutions gathering data on livestock.

Statisticians and animal production specialists need training on sampling techniques for measuring milk production, daily weight gain and other animal production parameters. All animal production staff need training on statistics.

Table 6-2: Number Of Cattle By Type, For Sampled Governorates, 1998

Governorate	Baladi	Exotic	Cross	Total
North Sinai	-	1333	241	1574
South Sinai	9	2	-	11
New Valley	34449	-	27549	61998
Nubaria	25451	31605	3300	60356

Source: Statistics of Animals, Poultry and Fishery Wealth, 1999, p.2.

6.2 Data Reporting

It doesn't make much sense to devote a lot of resources to improving the coverage and quality of data if it is not reported correctly and in timely fashion. With respect to current statistics, the data are published within a reasonable time. The quality of the reporting with respect to the New Lands, however, leaves very much to be desired.

6.2.1 Data from the Mubarak Project

A substantial number of the problems with data for New Lands come from how data for the areas covered by the Graduates project are collected and reported. Until very recently, and perhaps even now, data on fruits and vegetables come to the GDAS from the General Supervisory for the Graduates Project as annual totals, by crop, for the entire crop year. The data are not broken down by season or by governorate; as a result, the GDAS is not able to verify their accuracy. They must take them as they are. This presents problems for the ministry's new publishing format which publishes data by season, with summer and nili crops reported separately in one volume.

As described earlier, the Graduates Project collects data on the graduates and beneficiaries and, in some cases, on small investors with holdings of less than seven feddans. Their reclamation areas are located all across the country. Most of the governorates who report these data for their governorate get them from the local supervisory on an informal basis. Many do not report them, assuming the GDAS gets the data from the project anyway. There is no consistency.

In the official published data for the summer season, 1998, for example, area and production data are reported by governorate. The desert governorates, Noubaria and New Lands inside of the old valley are reported separately at the bottom of the tables (see Table E-1 in Annex E). Looking more closely at the data indicates that, data for fruits and vegetables reported for this New Lands classification include only data provided to GDAS by the Graduates project. Table 6-3 shows this by comparing data obtained from the CAH on the Mubarak project with data reported for specific crops for the Summer and Nili crops in the GDAS published report. They are all identical. Compare, for example, the total for tomatoes in Table E-2 and Table 6-3.

6.2.2 Harmonizing Divergent Data

Every statistics service worthy of the name reviews and adjusts reported results in light of anomalies uncovered in survey data. Generally, such adjustments are relatively rare, and are done so as to avoid introducing a bias. Adjustments occur in both directions, up and down. We have the impression that such adjustments in Egypt are more common than not.

The Morsy et al. (1999) study showed that adjustments are made in agricultural data at virtually every level as it moves up the system of reporting for the Nili valley governorates. That study also documented that such adjustments introduce an upward bias in the reported results. There is little reason to expect the treatment of data to be much different in the New Lands, since the system for collecting them are the same. In this study, it was not possible to get sufficient information to uncover any type of bias introduced by this process as far as New Land villages and districts are concerned, but certainly it was possible to document frequent changes in the data between the various reporting levels.

The poor quality of data collection presents the justification for doing this. In fact, each year the GDAS obtains two estimates of area and yield, one from the MALR extension services and one from the combination of the crop cutting survey carried out by the Sampling Directorate and the area estimates provided by the Egyptian Survey Authority. Where there is a meaningful difference (±5%) in the two estimates for area, the DS takes another sample of the problem hodes to determine which is the better estimate, and to provide a basis for choosing which one to use in the official estimate. Each year a high committee meets to select which values to report. The process of making adjustments inevitably takes on political overtones, with the result that much of the advantage gained by using scientific sampling procedures is lost.

This process has limited relevance for the New Lands because the ESA does not gather area data in the New Lands, and the Sampling Directorate only gathers yield data there occasionally. Moreover, the SD collects yield plot data mostly for field crops, lacking the resources to make the frequent visits required to measure the harvest of most horticultural crops. This may be an advantage at this point, freeing GDAS to design and implement a more rigorous system pretty much from the ground up for the New Lands. Many of the necessary resources can be made available by reducing the amount of duplication in the current system, and by increasing reliance on the Sampling Directorate for yield estimates initially, and eventually for area and cost of production data.

6.3 Data Completeness

If the published MALR data for the new Lands category includes only the graduates, then it does not include area or production for any New Lands inside of the Old Valley that are cultivated by investors and squatters. It does include data on Graduates in Nubaria and the other out of valley governorates, so it can be only presumed that the data for Nubaria does not also include those data. The study team was not aware of this problem when did the field work so it was not possible to explore this potential double counting in more detail. But table 3-4 in section 3.2.8 shows how serious both of these problems could be. Graduates account for only about 15% of New Lands overall, using the definition

of all post-1952 reclaimed land, or perhaps 25% if only land reclaimed since 1988 is considered. Moreover, about half of all reclaimed lands are located in old valley governorates, also shown in table 6-4. Remember, these data are fairly rough, but the magnitude of the problem is indisputable: data on area and production for New Lands are seriously incomplete. It can be said that either all data on New Lands inside of the old valley are included in the statistics for the old lands, or they are missed entirely. From the interviews, it was discovered that it is both; some governorates get most of it, some not much. But, except for the graduates' data, none is reported separately for new and old lands, it is all in with the old lands, if it is counted at all.

Some of the area and production of investors are included in the statistics for the old valley governorates, especially in Ismailia. It is by no means all of it. On the other hand, some observers believe that the area reported as cultivated in the New Lands is based on the area reported as reclaimed, not the area actually cultivated, and thereby overstates the actual area cultivated in those New Lands areas for which data are provided.

Based on this analysis, coupled with the results of our field interviews of administrative and technical officers responsible for reporting these data, it was estimated that most of the data on squatters, representing perhaps as much as 15% of the area reclaimed after 1982, as well as 40-50% on the data of investors, both inside and outside of the valley, are simply not reported. Taking all of this into account, it is estimated crudely that as much as 35% of area cultivated in the New Lands is simply not reported in the official statistics. This could include as much as 8% of the country's total cultivated area, assuming that 40% of reclaimed land is not cultivated.

6.4 Data Presentation

In the published volumes of MALR official statistics which were examined for data on the New Lands, there is no discussion of how data are collected, how the seasons are defined, or even the period to which the winter crop applies-whether winter 98 applies to the year in which the winter crop begins (1998-99), or the year when it ends (1997-98). Reporting categories don't mean the same thing or are not consistent between volumes covering the same agricultural year. Formats change from one year to the next or between tables within the same volume, with little attention to continuity or the integrity of time series data. Data on New Lands and data from Graduate Project areas are not clearly identified as such, requiring the reader to seek oral explanation, with all of the imprecision and room for error and misunderstanding that entails. There are even errors of mis-classification[4] and addition.[5]

[4] In the section for summer Makat (1998), it is reported that Nubaria cultivated 21,741 feddans of pineapple with a productivity of 8.39 tons/feddan and a total annual production of 182,335 tons. According to the team's knowledge, this is most likely cantaloupe of a variety named Annanas. Egypt does not produce pineapple commercially.

[5] See the out-of-valley and grand totals for dry kidney beans in table A1-2, and the same totals for green beans in table A1-3 in Annex 1.

Table 6-3: Comparison of Area Cultivated According to MALR and Mubarak Graduates Project Summer and Nili Crops, 1998

	MALR New Lands Only	Total Out of Valley	Graduates
Fruits			
Citrus	7,460	99,808	7,460
Grapes	2,114	77,479	2,114
Mango	1,556	13,113	1,556
Banana	2,536	18,392	2,536
Apples	4,302	51,905	4,302
Peaches	887	85,687	887
Figs	464	59,705	464
Vegetables			
Tomato	35051	129,451	35,051
Squash	6,408	24,829	6,408
Eggplant	4,098	10,814	4,098
Pepper	4,406	13,735	4,406
Cucumber	496	5,507	496
Peas	1,373	1,373	1,373
Cantaloupe	2,604	3,498	2,604

Source: 1) MALR, Economic Affairs Sector, Agricultural Economics, Vol.2, Summer and Nili crops, 1999.

2) Statistics Directorate, CAAE, MALR

Table 6-4: Area Reclaimed by Governorate 1952-1997

Governorate	Area Reclaimed				
	Public	Private	Total	Allocated to Graduates as of 6/96	Actually Distributed as of 6/96
Qalubia	2,000	-	2,000		
Ismalia	66,900	29,000	95,900		
Suez	5,300	3,000	8,300		
Sharkia	161,600	201,500	363,100		
Total Damietta	6,610	-	16,610		
Port Said	28,500	103,420	131,920		
Dakahlia	45,985	3,500	49,485		
Sub-Total East Delta	**316,895**	**340,420**	**667,315**	**65,700**	**26,920**
Kafr El-Sheikh	133,700	63,475	197,175		
Menoufia	-	56,800	56,800		
Sub-Total Middle Delta	**133,700**	**120,275**	**253,975**	**-**	**-**
Beheirah	35,769	14,000	49,769		
Alexandria	42,600	-	16,500		
El-Nubaria	592,359	102,976	695,335		
Matrouh	22,380	171,000	193,380		
Sub-Total West Delta	**693,108**	**287,976**	**954,984**	**148,170**	**118,100**
Giza	5,254	34,000	39,254		
Fayoum	11,800	7,000	18,800		
Bani Sweif	20,000	-	20,000		
Sub-Total Middle Egypt	**37,054**	**41,000**	**78,054**	**20,000**	**8,200**
Minya	64,500	-	36,600		
Assyout	4,000	-	4,000		
Sohag	15,200	-	15,200		
Qena	47,750	22,402	70,152		
Aswan	48,850	-	48,850		
Sub-Total Upper Egypt	**180,300**	**22,402**	**174,802**	**99,900**	**21,380**
New Valley	88,886	2,000	90,886	*	*
Sinai	46,358	285,250	331,608	12,160	8,070
Other Areas				54,160	54,160
Grand Total	**1,496,301**	**1,099,323**	**2,551,624**	**400,090**	**236,830**
Total for Out-of-Valley Governorates	**748,000**	**560,000**	**1,309,000**		

* Included in sub-total for Upper Egypt

Sources: GARPAD (1997) and Hussein et al. (1999)

6.5 Conclusion Regarding Procedures

This analysis demonstrates that the MALR system for classifying and reporting on the New Lands is not conducive to reporting data accurately. Even when the GDAS tries to compensate for problems it recognizes in the current system, the solutions often present other problems. The pressure to get data on New Lands by governorate has led to decisions regarding attribution and reporting that are misleading and inconsistent. For example, a breakdown, by governorate, of the New Lands data on fruit and vegetable area for the Graduates Program which was obtained and reported in Tables 4-3 and 4-4 in section 4.2. These same data are reported as the separate total for each fruit crop in the New Lands in Volume 2 of the 1998 statistics report (EAS, 1999b). The result is presented in Table 6-5. It shows the same total fruit area, which includes graduates in Noubaria, and perhaps in Matrouh and New Valley, but now there is no fruit production for any traditional New Lands governorate; it has all been allocated to other governorates. This is fine as long as there are no graduates in Matrouh or New Valley, and the area for those in Noubaria are allocated to their respective administrative governorate. Assuming this is true, however, we know there is a lot of fruit production among investors in these governorates, as well as in North Sinai. What happened to that? It appears that it has all been classed as old land area instead of being classed all as New Land area according to the current MALR definition. So for some tables these are New Lands, for others, they are old land, if not missing. Clearly, adopting a reporting format that treats all geographical areas consistently, and that separates data from the Graduates Program from data on other classes of farmers that are collected separately, such as for large investors, would go a long way toward providing a more transparent and, as a result, a more complete and coherent system of reporting.

In the age of linked spreadsheets publishing data in a consistent format, with correct totals and constant values from one related table to another, should not be too difficult. The data may come from different services, each with their own reporting format, but if all of the components are there it would not involve much work to rearrange them to a standard format. Better yet, everyone at all levels would benefit if the Statistics Directorate would prepare blank tables for reporting data at the village, district and governorate levels for all of the central administrations, their agents and those of the Mubarak Project. This would help ensure that issues of definition, coverage and coordination receive at least some consideration.

Table 6-5: Total Area under Fruit Crops, Old and New Lands, 1998

Governorate	Total Area (Feddan)		Total
	New Lands	Old Lands	
Alexandria	-	13,264	13,264
Beheira	8,229	61,942	70,171
Gharbia	-	27,991	27,991
Kafr El Sheikh	-	3,963	3,963
Dakahlia	-	13,492	13,492
Damietta	-	5,837	5,837
Sharkia	-	88,581	88,581
Ismailia	-	54,183	54,183
Port Said	-	-	-
Suez	-	3,398	3,398
Menofia	-	37,147	37,147
Qalubia	920	47,469	48,389
Cairo	5,543	400	5,943
Giza	12,906	30,873	43,779
Beni Suef	66	8,838	8,898
Fayoum	5,289	21,677	26,966
Menya	715	20,695	21,410
Assuit	1,336	19,247	20,583
Sohag	383	6,139	6,522
Qena	985	8,752	9,737
Aswan	-	3,836	3,836
Luxor	47	1,463	1,510
Total inside the valley	**36,413**	**479,187**	**515,600**
New Valley	-	3,833	3,833
Matrouh	-	68,161	68,161
Red Sea	-	-	-
North Sinai	-	107,004	107,004
South Sinai	-	5,828	5,828
Nubaria	-	292,515	292,512
Total out of valley	**-**	**477,338**	**477,338**
GRAND TOTAL	**36,413**	**956,525**	**992,938**

Source: Personal communication with Mr. Ibrahim Shetta, Director, Central Administration for Horticulture, MALR.

7. FIELD TEST OF AN ALTERNATIVE DATA COLLECTION APPROACH

The Head of The Economic Affairs Sector is very aware of the problems with the current statistics program as far as the new lands are concerned. He requested that a method for collecting this data which the existing services could carry out on their own would be prepared. He felt that data on horticultural crops are pretty good, but data on field crops and livestock in the new lands are poor. He wants cost of production data, as well as better estimates of cultivated area and production in the New Lands.

As part of this study, a farmer questionnaire to be administered by extension agents or Department of Sampling (DS) field staff in the New Lands was designed and pre-tested. The questionnaire gathers data on cropping system, area cultivated, cost of production, the amount and distribution of output for individual crop enterprises or fields, and on livestock numbers and some livestock production. It would not cover minor crops, and would not go beyond livestock numbers and meat, egg, milk and manure production. A copy of this questionnaire is included in Annex F.

7.1 Description of the Methodology

The methodology tested is a single visit per farm, intended to be administered twice each year, once to cover summer and nili crops, and once to cover winter crops. This survey would supplement the objective yield measures made by DS field staff. Each visit would be to a new farmer each season. However, if GDAS determines that farmers can recall inputs for more than one season correctly, without mixing the seasons, then two passages per year may not be necessary; data for both seasons could be gathered at the same time.

In the teams' opinion, a survey of the entire farm or covering an entire year is neither desirable nor necessary. The focus should be on getting good estimates of area cultivated for the entire farm at each passage, and of production, input use and destination of output for a relatively few, important crop and livestock enterprises for the season under study. The number of crop and livestock enterprises can be expanded as the GDAS gains experience with the methodology and acquires more resources. Since cost of production does not change a great deal from one season to the next, it should be quite feasible to follow a multi-year rotation for collecting cost of production data, perhaps hitting only three to five crops each year, and returning to the same crop only once every three or four years.

With this system the extension service could continue to provide area estimates for all crops, and yield estimates for crops not covered by the DS surveys. But it would relinquish estimating yield for crops followed by DS, and eventually would relinquish estimating area for all but specialty crops not covered by the DS surveys. District and governorate statisticians, agricultural affairs officers and the agricultural directorate would get their yield and cost of production estimates from the Sampling Officer in the district or governorate. They would no longer have to generate them themselves. They could, instead, devote more time to supervising implementation and expansion of the new system.

7.2 Problems Encountered and Proposed Solutions

Prior to the field test there were some concerns that large farmers would not take the time to respond to the questions, so it was intended to target them disproportionately in the pre-test. Because of the time and distance involved in tracking them down, however, it was not possible to put this concern to a real test. Large farmers are more dispersed and require more time and transport to search them out for the interview. Since a formal sample for the pre-test was not drawn, and smaller and medium farmers were everywhere, it seemed that seeking out a large farmer was a waste of time. In an actual survey the enumerator would have to search out every farmer, large or small, selected for interview, so the perception of larger farmers taking more time would not be so real. The survey did not have a single farmer with a holding over 80 feddans in the entire sample of 92 farmers. There were seven farmers with holdings between 50-80 feddans, six between 25-50, 15 between 12-20, 22 between 6-10, and 42 with five feddans or less of cultivated area. The farmers interviewed, however, including those with 50 feddans or more, were quite cooperative and open with the required information.

Extensive discussion was made with GDAS staff over the design of the questionnaires. GDAS staff wanted separate questionnaires for field crops, fruit crops and vegetable crops, even though 70-90% of the input and marketing items are the same for each type of enterprise; only 10-30% of the activities or inputs were directed at only one type of enterprise. While this made data entry more straight forward, it made survey administration more rigid and costly. Some farmers had only field crops, but the questionnaire had one form each for field crops, fruit crops, vegetables and livestock (this was done in order to uncover as many potential problems as possible). So instead of being able to gather data on three crop enterprises, the enumerator left after getting data on only one. This was an enormous waste of transportation and setup resources since that is typically the largest portion of the cost in a random sample survey.

Of course, there are other solutions to this problem. The enumerator could have a stock of forms for each type of enterprise and simply use and attach the correct types to each cropping pattern questionnaire. That has the disadvantage of potentially creating multiple components that do not get attached to the main questionnaire or that get separated from it. It seems to the study team that a fixed questionnaire able to handle three of any type of enterprise per farm, would, with proper training for the enumerators, provide a more easily managed survey instrument.

Getting input-output data on three enterprises per farm visit was determined to be a very manageable task, taking a bit longer where there were three different types of enterprises, but still able to be completed in well less than an hour if there are no livestock. If there are livestock the crop input-output questions should be limited to one forage crop or, if none, one field crop plus the livestock schedule, instead of the other two crop enterprises. It will be necessary for the GDAS to define a protocol to follow for selecting the crop enterprises for which the enumerators are to gather input-output data, with an eye for minimizing any potential bias for what will prove to be very necessary and very desirable departures from simple random sampling procedures. These priority crops could differ by district, provided the number of observations for each type is sufficient within a district to produce the statistical level of precision sought by GDAS. It was suggested to completely ignore intercropped fields for the input-output study; focus on important crops in single crop stands.

Revised versions of the English and Arabic current statistics questionnaires are included in Annex F, along with the English version of the enumerator manual. The manual explains the approach in more detail for the interested reader. These versions include changes suggested by our pre-test; most of the changes relate to inserting uniform codes for the same activity on the different enterprise input forms. As with the original version, there are separate forms for field crops, fruits, vegetables and livestock. The reader should be aware that the livestock part of the questionnaire has not been properly pre-tested. Sufficient number of farmers with large numbers of livestock was not encountered in the pre-test to do this.

8. IMPROVING COLLECTION OF STATISTICS ON THE NEW LANDS: REQUIRED STEPS

It should be clear from the discussion so far that the current statistics system of MALR is not producing good quality data on agricultural production in the New Lands. There is a lot that can be done in both the short run and the long run to change this situation. In this section the study focuses on improving how the data are collected. The discussion focuses on clearly defining the reporting units and alternative ways of collecting the data.

Ensuring complete coverage of New Lands by the administrative structure is not a panacea for data collection problems in the New Lands. It will be expensive; and resources are still limited. Many of these areas do not have extension agents assigned to them, and many administrators resist recognizing the existence of squatters by not collecting data on them. They have no intention of covering them in their work plan. Moreover, there has always been a problem of coverage for large investors, even in the existing districts, and it appears to be much worse in the New Lands. A sampling approach, therefore, can probably provide much more complete and accurate data for these areas than an expansion of the administrative structure, even though that may be necessary anyway for other reasons. Even sampling will not produce good quality data if the resources are not forthcoming as required.

To improve the completeness of agricultural data MALR needs a better system for making sure that New Lands not covered by existing administrative boundaries get covered, whether by expanding the range of existing administrative areas or by sampling those New Land areas that fall outside of traditional administrative boundaries. In either case, there has to be common understanding of where these areas are.

8.1 Clearly Defining The Reporting Units

The first step in this direction is to agree on a common, workable and useful definition of New Lands. For both administrative statistics and the sample survey approach the study team proposes that the starting point for defining New Lands be all of those areas developed by the Permanent Authority for Land Reclamation, a forerunner of GARPAD, and by GARPAD itself since 1952. To these areas it will be necessary to add other areas in each governorate developed since 1997, and some areas not reclaimed by GARPAD at all, but by investors and squatters both prior to, and after 1997. The data would then be grouped or stratified according to the three phases of new lands defined in section 3.4.2, or according to another agreed upon system of classification.

There are two sources of data for beginning to define New Land areas unequivocally: GARPAD itself for data on the size, name, location and time of reclamation for each area it has developed since 1952, and the current agricultural census reporting clusters. Where the two conflict, the Agricultural census reporting clusters appear to provide the more accurate source, based on the limited information available on the census at this time.

8.1.1 Using GARPAD Data

The areas developed by GARPAD are clearly definable geographical areas; all those developed prior to 1997 are listed in a recent GARPAD report (GARPAD, 1997). While it would be nice to get data on these areas from GARPAD, such cooperation is by no means easy to get, or even necessary in order for this list to help provide complete coverage of cultivated area in the New Lands. All that is needed is that these areas be identifiable geographically by someone in the governorate. The study team has the impression from field work that all such areas can be so identified by governorate level officials. It is not necessary that they know how much of each area is reclaimed or cultivated in order to begin, although that would certainly be helpful, only that the area be uniquely and clearly identifiable geographically. In effect, each of these areas will become a first stage sampling unit in an area sampling frame constructed for the New Lands in each governorate. Because these areas are relatively large, it should not be administratively difficult to keep data on them separate for reporting through the administrative statistics structure.

An analysis of GARPAD reclaimed areas shows that, as of 1997 only 15 of 103 areas, representing 40% of the total reclaimed area, had reclamation activities in both the first and second phases. These areas present a problem for being classified clearly as one phase or another. Seven of these 15 areas, representing 25% of total reclaimed area, were 85% or more reclaimed during only one of the phases. Four others, representing 6.5% of total reclaimed land, were 75%-85% reclaimed during only one of the phases. Only six areas, including West Noubaria and El Zawiah/El Mansour, representing 8% of total reclaimed area, experienced reclamation activities spread more evenly across both phases and, therefore, present significant problems for classification. In the initial classification system, it is proposed that all of these areas be allocated to the phase in which the majority of their respective reclamation activities occurred, unless the agricultural census can be used to provide a finer breakdown.

8.1.2 Using Agriculture Census Reporting Clusters

The year 2000 agricultural census can be used in conjunction with the GARPAD reclamation areas to develop more complete coverage of those New Land areas reclaimed by squatters, many of whom appear to have reclaimed land not surveyed and prepared by GARPAD, contrary to current public policy. It should also facilitate a more refined classification of those reclamation areas that spread across two phases since reporting clusters are much smaller than reclamation areas. In creating the reporting clusters for the census, planners took care to not cross administrative boundaries and to not mix old and reclaimed lands in the same cluster. They are collecting data on irrigation system and water source, but not time since reclamation, perhaps the single most important variable for classifying New Lands. Accordingly, it will be necessary for the Statistics Office to undertake an initial assessment of the clusters of census reporting districts identified as New Land clusters in order to identify the predominant reclamation phase of each one. In all but six reclamation areas, most clusters will be in the same phase. In many of the remaining ones, most of the census reporting clusters will fall in only one phase, even though other enumeration clusters in the same reclamation area may not. This stratification should not, therefore, prove too difficult for governorate officials, especially if the kind of coordination recommended at the governorate level between the agricultural services, the GDAS, GARPAD and the Graduates Project is established.

8.2 Improving Coordination at The Governorate Level

Besides clearly defining the New Lands and identifying each New Lands reporting area on the ground, there is need for coordinating the collection of agricultural data from the Graduates Program, GARPAD, and the Horticultural, Livestock and Sampling General Directorates, at both the national and the governorate levels. Such coordination is necessary both to ensure that all New Land areas are being counted by someone, and to avoid double counting. To accomplish this, it is proposed that the Minister activate the ministerial decree of establishing the National Level New Lands Data Coordinating Committee and make sure it includes the Agricultural Affairs Officers from each of the Governorates where New Lands are located. Their administrative status as under-secretary makes it imperative that they participate in the National Committee. MALR should also form parallel governorate coordinating committees consisting of the corresponding governorate or supervisory district officers covering each governorate, including, again, the agricultural affairs director for the governorate.

The role of the National Level Coordinating Committee would be to facilitate the work of the governorate committees. The real coordination should occur at the governorate level. The governorate coordinating committee will have several functions:

- ensure that the governorate coordinating committee gets data from GARPAD on the allocation of reclaimed lands in the governorate, by user group;

- ensure that all newly reclaimed land, whether reclaimed by GARPAD or by private investors or squatters, gets inventoried, its holders identified, its current cultivated area estimated, and responsibility for gathering current statistics gets assigned to someone;

- ensure that the Graduates Program reports data on graduates, beneficiaries and small investors in the governorate that fall under its supervision, directly to this committee first, rather than to the GDAS; and,

- ensure that yield estimates derived by the Sampling Directorate are distributed to technical officers at both the governorate and district levels, and that the technical officers distribute their estimates to the other technical directorates.

The national coordinating committee should have an executive secretary whose task will be to work with the governorate committees to help them identify land which should be classified as New Lands in each governorate, using the 103 GARPAD reclamation areas as a point of departure, but relying on the agricultural census reporting clusters as much as possible. In this way, land that has been reclaimed over 20 years that is already being included in extension programs and in statistics on the old lands, can remain in the old lands classification if the governorate officials and the executive secretary of the Coordinating Committee agree that such is appropriate. Lands falling outside of the traditional data collection system can be clearly identified, and special efforts can be made to estimate their cultivated area by type of farmer. This area can then be allocated to the appropriate New Lands classification. By working closely with the Graduates Program and GARPAD at the governorate level, where much more is known about reclamation areas, it should be possible to combine data from the various sources

to define, over time, a relevant and increasingly accurate and refined area-based sampling frame for collecting data on the New Lands. The executive secretary, with the guidance of the National Committee, will become the arbiter of which reclaimed lands to include in New Lands and which to place in an old lands category.

8.3 Building the Sample Frame

Once the GARPAD reclamation areas or the census reporting clusters are grouped into geographically defined New Lands phases, analysts can calculate the area cultivated, by important crops, for each area or reporting cluster or group of reporting clusters, using the census data for 2000. With the census data, each area or cluster can be grouped by phase, the type of water source or the type of irrigation system they use, or whatever variable a particular researcher determines is most relevant for a particular study. The census data will provide a known cultivated area and general cropping pattern for each cluster/group. It is expected that contiguous clusters will have similar attributes for such variables so that relatively few, sufficiently large areas will be identified in each governorate. This is necessary to minimize the burden of collecting and reporting separate administrative statistics for these areas; indeed it may be necessary to forgo some refinement for the sake of work ability as far as the administrative statistics program is concerned. At the same time, GDAS will have a lot of data at its disposal for preparing a sample frame targeted at more refined categories or smaller clusters of similar reclaimed lands should it decide to adopt a scientific sampling approach to collecting data on the New Lands.

8.4 Collecting the Data

Once the area in the various classes of new lands is clearly identified on a map, the next step is to establish a methodology for getting data on those areas, with limited resources. The most important number is the area cultivated, by crop if possible. This will solve the problem of incomplete coverage and at least provide a basis for making estimates based on what is known about similar areas, if nothing else.

8.4.1 Area Cultivated

Hopefully area cultivated in 2000 will be available from the census. That would be ideal. But it is not essential. If the census data turns out to not be available for this, or to not provide the detail needed for classifying each reclamation area, district and governorate statistics officers can be instructed to guesstimate area using whatever information is available to them.

To facilitate guesstimating, the study team prepared a database of GARPAD reclamation areas in each governorate, including the area reclaimed, based on a relatively recent GARPAD report (GARPAD, 1997). Moreover, land in some reclamation areas that fall in more than one governorate had to be divided and allocated. This allocation may not have been made very well. These are only obstacles to be overcome, they are not major problems. What is important is that officials in each governorate should understand that they must get estimates of cultivated area, by crop, for all of these areas. They also must appreciate that it is essential that such estimates be complete and, at the same time, must avoid double counting with the Graduates Program and neighboring governorates, even if the estimates

are crude. Refining them can occur over time, once statistics officials recognize the New Lands areas in their governorates, and accept responsibility for collecting complete data on them.

Up to this point the process of strengthening the quality of New Lands data is pretty much the same whether talking about the administrative statistics program or an expanded sample survey approach. From this point forward, however, getting better data on the New Lands will require a greater commitment of resources. The area and cropping pattern data available from the agricultural census will become quickly outdated in those New Lands that are experiencing current reclamation and settlement activity. Something will have to be done soon to avoid losing the momentum the census is providing for improving the quality of data on the New Lands.

8.4.2 Current Statistics

Apart from a major restructuring of how current agricultural statistics are collected in Egypt, there are really only two choices for getting quality current statistics on the New Lands: expand the administrative statistics program by adding or enlarging administrative areas to include all newly reclaimed areas, or utilize a sampling approach. The former requires the addition of sufficient extension agents or cooperative managers to provide complete coverage of all New Lands areas. The sampling approach requires a lesser commitment of resources, can be put in place more quickly and, if properly executed, promises to provide good quality data at a fraction of the cost.

The sampling approach can even be used just to cover those New Land areas that are now being ignored. It could begin as a supplement to the administrative statistics program, getting area, yield and cost of production data in just these areas. That would solve the problem of incomplete coverage, and would provide good quality data on these areas as well. As DS gains experience with the new methodology and expanded duties assigned to it, especially in dealing with a much larger area and with squatters and large investors, it could expand to include all New Lands. This is the direction the study recommends.

9. SUMMARY: FINDINGS AND RECOMMENDATIONS

The major finding of this study is that the coverage of available data on New Lands is very incomplete and their accuracy are poor. At the same time, the fact that the agricultural census is occurring in 2000 presents a rare opportunity to correct this situation in fairly short order. The recommendations of section 9.2 show how this can be done.

9.1 Findings

? There is no clear definition of New Lands accepted by all the important participants in the MALR data collection and reporting system; Governorate and district statistics, sampling and horticultural officers do not always share the same definition even though they are reporting to each other about them. The definition even changes between reports showing the area in specific crops in the New Lands.

? Important parts of the New Lands are not covered by any agricultural administration, and no data is gathered on them. Some governorates allocate such outlying areas to another district for purposes of collecting data, but not all do. The study team has the impression that substantial New Lands areas are not included in current statistics on New Lands.

? There is no formal coordination at the governorate level between the various entities responsible for reclaiming New Lands, developing them, servicing them and reporting on them. GARPAD does not communicate well with the governorates to inform them regularly of reclaimed land allocated to various holder groups. The Mubarak Graduates Project does not provide the governorates with crop area, yields or production for its participants. As a result it is very difficult to know whether all areas are being covered and by whom, and if covered, whether the data are included with Nile Valley land or are reported as New Lands.

? The Mubarak Graduates Project maintains an independent structure for collecting and reporting on current agricultural statistics relating to its project areas. These data are reported directly to the GDAS and are not broken down by governorate or season. This makes it very difficult to check on the integrity of the data.

? About half of all reclaimed lands are located in Nile valley governorates, and about 25% of all land reclaimed since 1988 have been allocated to the Mubarak Graduates Project. Yet the only area in horticultural crops reported for New Lands in the Nile Valley is that reported for the Graduates. It appears that at least half of the New Lands in the Nile Valley are either classed as old land or are missed.

? The agricultural census has prepared a sample frame for the 2000 census that clearly separates old and New Land areas. This sample frame presents a unique opportunity for the GDAS to measure the extent of missing or misclassified data and to ensure more complete coverage of New Lands in current statistics in the future.

? Current statistics published for the New Lands as well as the Nile Valley are not very professionally reported. There is a general failure to distinguish between zero values and missing and incomplete data in reported or published data. The presentation formats both in the same volume and over time are not consistent, making comparisons unwieldy, difficult or impossible. Finally, the data contain arithmetical errors and inconsistencies that should be corrected before final publication.

? There is a general lack of sufficient resources at the local, district, and governorate levels for officers at those levels to cover remote areas or to cover large investors or squatters. Many of the New Land areas are widely dispersed and difficult to access. An unknown, but probably large proportion of these holders are missed. Getting good data on them will be considerably more expensive than for the Nile valley farmers.

? There is no consistent reporting format for passing administrative data from the extension agent to the GDAS in Cairo. This makes it difficult to monitor missing data and deal with them effectively.

In terms of the data that are actually reported, coverage is best for horticultural crops grown by participants of the Mubarak Young Graduates project. It is not known what the quality of the data are because there was no access to data as they are reported up the chain for most of the Graduate Project areas visited. There are no horticultural data reported separately for any other New Land areas. To the extent that such data are counted, they are included in the area and production for the old lands. It is important to note that the statistical reports do not point out that the data as presented are only for the Graduates Project; they give the impression that the data cover all New Lands in the reporting category.

9.2 Recommendations

? EAS/MALR should take immediate action to ensure that the data being collected by the agricultural census includes information on class of holder (graduates, beneficiaries, investors, and squatters) and time since reclamation for the holding. This information is critical for developing a stratified sampling frame for future primary studies on production technologies in the New Lands. A special effort is required to include data on squatters.

? EAS/MALR should develop a comprehensive, nationwide sampling frame based on the census reporting clusters used in the agricultural census. It should include selected critical information necessary for stratifying each reporting cluster according to a number of likely criteria.

? As soon as the sample frame permits, EAS/MALR should adopt a definition of New Lands that is more focused on lands actually reclaimed as New Lands rather than on the administrative location of the land. This process can be facilitated by grouping reclaimed lands in each governorate into clusters that can be reported on separately, prior to aggregation for the district

or governorate. The agriculture census reporting clusters and the GARPAD project development areas are two sources of information necessary to do this.

? MALR should activate the Ministerial level New Lands Data Coordinating Committee, and make sure it includes the Undersecretary of the Governorate agricultural affairs. His administrative status as an under-secretary makes it mandatory that he participate in the national committee. A parallel committee should also be activated at the governorate level. The purpose of these committees is to ensure that all New Land areas are fully covered by the administrative statistics on New Lands, and the data are available and reported at the governorate level by the governorate itself. The committees will ensure that data on the Graduates project is also reported in this way, directly to the individual governorates. The ministerial committee should have an executive secretary whose task will be to assist the governorates in identifying, classifying and clustering New Lands in the governorate for reporting purposes.

? EAS/MALR should expand the duties of the Sampling Directorate to include collection of yield, area and production cost data on crops important to the New Lands, beginning with those areas currently not well covered by the existing administrative statistics program. Eventually this effort should be expanded to include the Nile valley governorates.

? MALR should require the Mubarak Project to report its area and production data to each governorate directly, by season and by governorate. For those Graduate Project areas falling in more than one governorate, of which there are not as many , the data collection and the recommended coordinating committee at that level can work with the Mubarak Supervisories to allocate area and production between the governorates concerned so as to avoid double counting.

? The statistical reports of the EAS should either report data on Graduates as a separate category at the bottom of the tables, or expand the reporting and coverage of New Lands inside of the old valley so that the coverage of the data are clear to the user. The reports should also contain a discussion of reporting period, aggregation procedures and missing or incomplete data. It should adopt a convention for alerting the reader that data are missing or incomplete and not zero.

9.3 Training

9.3.1 Training Needed

The interviews on the district and governorate statistics officers revealed a surprising lack of degree level training in statistics and no apparent in-service training program directed at correcting this situation. Virtually all officers at the district level or above felt handicapped by their lack of training. There was also a serious lack of computers and storage facilities for data. Any attempt to create a sample frame covering the New Lands and to use sampling procedures to gather current statistics will quickly run into a problem with technical capacity.

The quickest way to provide the training needed to mount this kind of effort is to build it around the upgrading program itself, once MALR decides on a course of action for improving the quality of agricultural data. Training should be provided to those officers who will be responsible for implementing the new program. It should include the principles of sample frame construction and maintenance; stratified multi-stage sampling, estimation of sample size and sample survey administration. It should also include data entry, tabulation and storage using micro computers.

9.3.2 Proposed Training Programs

The New Lands statistical officers in addition to all other persons that will participate in the data collection in the new lands must attend intensive training programs. The persons proposed to attend this training program should include horticulture and livestock specialists. The statistics training programs include three stages:

1. The first stage would aim at providing the trainees the basic tools and methods of statistical presentation and analysis. It should be held before the beginning of data collection on area cultivated. This stage would be for one week to concentrate on:

- The definition of the new lands and the different types of farm systems in addition to the use of the tables prepared for the area cultivated by each type of farm producer and the format for the cropping patterns.
- The methods of statistical presentation: tables, and graphs.
- The measures of central tendency (simple arithmetic mean, weighted arithmetic mean, median, and mode).
- The measures of dispersion (range, mean deviations, variance, and standard deviations).
- Measures of significance (T-test, and F-test).

2. The second stage would be for two weeks to be held before the data collection on yield and production (at the end of the first year of the program for the region) and to concentrate on statistics, with special emphasis on sampling techniques, mainly:

- Simple Random Sampling.
- Stratified random Sampling.
- Multistage Cluster Sampling.
- Subjective Sampling.
- Testing hypotheses.
- Correlation and Linear regression.
- Time series analysis.

3. The third stage would be for two weeks before collecting data on costs of production (at the end of the second year of the program for the region) and to concentrate on:

- Definitions of inputs / outputs, fixed / variable, and production function.
- Definitions and types of technical coefficients.

- Production functions and optimizations.
- Definitions of production costs, explicit (accounting) and implicit (non- accounting) costs, variable and fixed costs.
- Preparation of Crop Budgets and Farm Budgets.
- Cost Functions, average and marginal costs.
- Questionnaires prepared and tested for the collection for data on costs of production, marketing and prices of the agricultural commodities.

9.4 Required Equipment

Computers: It would be ideal to have a computer for the statistics section in each governorate with a complete network connected with the General Directorate for Agricultural Statistics which will expedite the transmission of instructions from the central office to the governorate level and to transmit the statistics from the governorate to the central office. However, if this could not be realized in the short run, then the minimum requirement would be a computer for each of the main seven areas of new lands to be used for storing, tabulation and analysis of the data collected, not only for the new lands but also for the old lands. If such computers will be made available, the training program should include additional two weeks for training the statistical officers on the use of computers and the different methods of tabulating and analysis of the statistical data. A prerequisite will be a small hand calculator for each statistical officer.

Transport vehicles: Each of the statistical officers should be provided with a motorcycle to facilitate his activities. However, some clear and fair rules for the operation and maintenance costs should be set in advance in order to achieve efficient operation of these vehicles.

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ANNEXES

ANNEX A: ANNOTATED BIBLIOGRAPHY FOR NEW LANDS STUDIES & DATA

NEW LANDS BIBLIOGRFAPHY

I HISTORY AND POLICY OF LAND RECLAMATION

? **El-Meenawy, Mahmoud M., " Analytical Study for main determinants of horizontal Agricultural Development with special emphasis on the national cultivation Policy", M. Sc. thesis, College of Agriculture, Alexandria University, December, 1988. (Arabic).**

The study aimed at:

1) Investigating the main drives for the horizontal agricultural development in Egypt.
2) Estimating the impact of the major economic determinants for the horizontal expansion in Egypt.
3) Identifying the main obstacles.
4) Evaluating the ownership or rental cultivation policies in Egypt.

The study indicated the following:

- ? The increase in the number of tractors by 10 % would increase the reclaimed area by 4.2 %.
- ? The increase in the financial resources for the reclamation area by 14.8%.
- ? The increase in the number of graduates from agricultural colleges and high institutes reduces area cultivated by 4.5 %.
- ? The government policy for cultivation of the reclaimed lands during the period 1952-1970 was based on the establishment of state farms applying modern scientific technology on the big scale farming operation with the long run objective of transferring these farms to agro-industrial complexes. However, the inefficiency of the public and government sectors in the operation of these farms led to a decline in the productivity of these lands and the decline in the ratio of cultivated to reclaimed lands. The end result was the sale of these farms in relatively small plots to private farmers.
- ? The government policy during the seventies was directed toward the expansion in the distribution of reclaimed land to small farmers and graduates and encouraging the establishment of reclamation cooperatives.
- ? The government policy was directed in the eighties on the emphasis for land reclamation in the areas adjacent or closer to the old agriculture land due to the availability of the required infrastructures in addition to the development of water resources.
- ? The main problems facing land reclamation are: administrative and planning inefficiencies of the reclamation authorities with little attention given to technical or economic standards; lack of coordination between infrastructure works and reclamation works which limits the optimum use of the reclaimed areas; lack of financial resources; insufficiency of irrigation and drainage structures; insufficient labor force due to the problems of settlement in the remote reclaimed lands; shortage of farm inputs due to lack of credit and lack of suitable marketing system; and tremendous increase in the cost of land reclamation during the period from 1971 to 1986 which increased the burden on the government budget.

In the 1982/83 - 1986/87 five-year plan, the rate of execution was only 50.0 % of planned irrigation and drainage infrastructures; 34.0 % in electricity; and 24.0 % for main roads.

? **Hussein, Sayed; Gleason, Jane; Hassan Ahmed; El-Kholy, Elham, and El-Sayed, Nadia," Study of New Land Allocation Policy in Egypt", Ministry of Agriculture and Land Reclamation and U.S.A.I.D, APRP, RDI, Report No. 65, February 1999, (English).**

The report lies in 32 pages and focuses on the legal and policy framework within which reclaimed land is distributed to or purchased by farmers and investors. The study team of the report concluded that:

1. For the past four decades, the program of land reclamation has opened up more than 2.5 million feddans of desert lands for agricultural purposes. In the 1980s and 90s, land reclamation became a national imperative as the agricultural sector was liberalized, and the reclamation focus turned from the northern Delta to Upper Egypt and Saini, with an annual average of 100,000 feddans per year were reclaimed during these two decades. The Government of Egypt's ambitious efforts have provided the base for creating self-sufficient communities to help solve the problem of overpopulation in the Delta and the Nile Valley, as well as increase agricultural production and create new job opportunities. Land has been distributed to landless farmers and graduate families, as well as small, medium and large scale investors. By 2017, GOE planners estimate that additional 3.4 million feddans will be brought under cultivation, increasing the agricultural lands by 44 percent. Most of these lands will be reclaimed in large national projects, Toshki, North Saini, and East Owainet.
2. All land reclamation projects are planned by the General Authority for Reclamation Projects and Agricultural Development (GARPAD), an agency of the Ministry of Agriculture and Land Reclamation (MALR). The Ministry of Public Works and Water Resources (MPWWR) is also involved in the planning of these projects, as this ministry is charged with designing the primary levels of irrigation systems, and once this land is reclaimed, is responsible for delivering the water.
3. The total area reclaimed between 1952 and 1990 is estimated to be about 2.6 million feddans. However, a review of previous studies indicated a considerable difference between the area reclaimed and the net area cropped. Some estimates show that about 60 Percent of the reclaimed area has been cultivated (i.e. 1.6 million feddans). Total agricultural land is 7.8 million feddans, of which 20.5 percent was added from the new reclaimed lands.
4. Policies regarding new lands distribution are ambiguous and easily by-passed. Each classification of recipient of land – graduate, Landless farmer, small-scale investor, or large-scale investor – has a different set of rules governing acquisition, land use rights, title, incentives for investment, infrastructures, and level of matching investment they are required to make.
5. The land and water productivities are compromised by the ambiguity of a multitude of laws that apply to land distribution and titling. The body of legislation regarding land

distribution and titling is huge, with no less than six formal laws and literally hundreds of decrees and regulations.

6. Large number of public agencies and authorities have law - enforcement authority, and ownership rules and procedures for distributing land vary from one law or decree to another.
7. Investors are permitted to buy lands through multi-year payment schemes or through auction. Title is granted after the investors provide evidence of their seriousness to develop the land. The selling price is contingent on the location of the land with respect to roads, and the amount of infrastructure provided by the project. In more recent years, investors were asked to bear a larger percentage of infrastructure costs. Many large investors purchase and develop land for resale. This is permitted under Egyptian law, and it is a means of developing land using private funds that is highly encouraged by the Government of Egypt.
8. Land distribution and titling with regard to graduate ownership scheme is particularly prolonged and complicated. Ownership is granted to graduates only after payment of a nominal sum of money over a period of 30 years, with no provision for early settlement. Without title to the land, graduates are not free to sell or lease the land, and they are unable to obtain loans for investing in additional infrastructure or land improvements. The billions of pounds of assets frozen due to lack of title indeed has a depressive effect on the economy as a whole, representing a large loss of investment funds.
9. The Government of Egypt should conduct a comprehensive review of all the laws and regulations governing land reclamation with a view to removing the ambiguities within which the Ministry of Agriculture and Land Reclamation and those wanting to acquire new lands operate in addition to standardizing and making transparent the treatment of all who receive land.

? **Ministry of Agriculture and Land Reclamation,” Land Reclamation in Egypt”, 1998 (Arabic).**

This is a book of 285 pages concerned with history, legal, economic, social, and institutions related to land reclamation in Egypt laid out in seven chapters.
The book presented in the first chapter the evolution of land reclamation in Egypt while the second chapter deals with the legal framework of managing and exploiting and distribution of lands owned by the nation for the purpose of reclamation and cultivation. In the third chapter, the historical changes in the systems of management of the land for reclamation and cultivation are reviewed. The impact of land reclamation projects on the realization of social and economic objectives are presented in chapter four. The fifth chapter surveys the different companies and institutions the dealt with land reclamation. The sixth chapter presents the obstacles and limitations of land reclamation in Egypt while the seventh chapter presents a brief summery about the locations and areas of land reclamation projects in Egypt since 1952 until 1997. The following is a summery of the main issues presented in the book.

1. Evolution of Land Reclamation in Egypt:

From the beginning of the nineteen century, the Egyptian government began to take different steps in land reclamation depending on the political, social, and economic conditions. However, seven distinct stages could be identified:

One) First Stage: Before 1952:

In the nineteen century, there was a great revolution in Egyptian agriculture through the establishment of several irrigation canals and a number of barrages on the Nile to control the flow of water and increase the efficiency of utilization of this scarce resource. The main barrages of El-Kanater were built during the period 1847 - 1861. This was a necessary step to preserve water for land reclamation and increase the cultivation of cash summer crops. From 1813 to 1852, the cultivated area increased by 36.0 %. The establishment of Aswan reservoir started in 1898 and was completed by 1902 with a capacity of one billion c.m., increased in 1912 to 2.5 c.m., and in 1933 to reach 5.5 billions, which enables the increase in the cultivated area from 3.6 to 4.8 million feddan. Basin (Flood) irrigation was transferred to permanent irrigation. Therefore, the cultivated area reached 5.8 million feddans before 1952. Land reclamation before 1952 was undertaken mainly by the private sector, whether individuals or through land reclamation companies, with the help of the government.

b) Second Stage: 1952 - 1960:

Land reclamation by the private sector was found to lag behind the rate of population growth and there was a need for large reclamation projects and the necessity of building the High Dam in order to increase the cultivated area by 1.3 billion feddan. Four land reclamation government authorities were initiated during the fifties to take the responsibility of reclaiming 78883 feddan.

c) Third Stage: 1960 /61 - 1969/70:

This was the beginning of National Planning on scientific basis with five year plans, 1960/61 - 1964/65 and 1965/66 - 1969/70. This first plan aimed at reclaiming 723.4 thousand feddans, out of which 536.4 thousands were realized with a rate of execution about 74 %. The second plan aimed at reclaiming 750 thousand feddan, at the rate of 150 thousands per year, but due to the 1957 war the rate of execution reached 37 %. The total area reclaimed during that period amounted to 812.2 thousand feddans. Five Government authorities participated in land reclamation during that period.

Four) Fourth period: 1970/71 - 1979/80:

Land reclamation during this period was negligible due to increased importance of rehabilitation of Suez Canal cities and towns after the 1967 and 1973 wars. Only about 29210 feddans were reclaimed during that period. Reorganization of government institutions led to the initiation of the General Authority for Reclamation Projects and Agricultural Development - GARPAD in 1975 to be the main responsible institution for the planning and execution of the desert land reclamation.

Five) Fifth period: 1980-1986:

This period started with affiliating the Ministry of Land Reclamation with the ministry of Urbanization and new Societies and ended by affiliating it with the Ministry of Agriculture. In June 1983, Land Master Plan was prepared to indicate the new lands available in Egypt for agricultural development and setting priorities for reclamation. The area covered was 17.4 million feddan at the exploration level and 3.3 million feddans at the semi detailed state. The study was completed by 1986, the summery of which is indicated in the following table (in thousand feddans):

Region	**Type of Land Management** (3)					**Total**
	1	**2**	**3**	**4**	**5**	
East Delta (1)	268.5	--------	135.1	43.5	351.6	898.7
West Delta (1)	41.5	171.2	49.1	65.0	358.1	684.9
Middle Delta (1)	59.0	-------	-------	-------	-------	59.0
Middle Egypt (1)	-----	--------	31.5	6.2	186.2	223.9
Upper Egypt (1)	-----	3.6	160.1	342.5	275.4	781.6
Saini (1)	102.5	-------	-------	111.6	69.5	283.6
High Dam Shores (1)	-----	9.0	-------	--------	41.0	50.0
Sub-Total	**471.5**	**183.8**	**375.8**	**568.8**	**1281.8**	2881.7
New Valley (2)	1.5	62.5	14.2	-------	484.5	562.7 *
Saini (2)	------	-------	2.0	5.2	--------	7.2
Sub-Total	**1.5**	**62.5**	**16.2**	**5.2**	**484.5**	**569.9**
Grand Total	**473.0**	**246.3**	**392.0**	**574.0**	**1766.3**	**3451.6**

* Areas in western desert that needs more investigation.

(1) Regions whose development depends on the availability of surface water.

(2) Regions whose development depends on the availability of ground water.

(3) Land Management depends on the type of soil as follows:

- N0.1. Clay soils, very salty if not cultivated, little permeability.
- No.2. Sandy-clay soils, permeable.
- No.3. Deep soil, from sandy-clay to sandy -silt.
- No.4. Similar to No.3 but needs more leveling.
- No.5. Coarse sands.

Six) The sixth period: 1986 to 1997:

This period includes two five-year plans (1987/1992 and 1992/1997), with Ministry of Land Reclamation added to the Ministry of Agriculture. During this period, the economic reform program was enforced, giving the private sector greater role in the economic activities, including land reclamation, realizing about 75.0 % of land reclaimed during that period. At the same time, Mubarak National Project for Graduates started to help unemployed graduates to cultivate new lands. About 362 land reclamation cooperatives were established during that period.

Seven) The seventh period: After 1997:

It is the period when Egyptian, Arabic, and Foreign investments in land reclamation is encouraged, with five-year plans during the period from 1997 to 2017 aiming at reclaiming about 4.3 million feddans throughout the different regions in the country as indicated in the table below:

Region	**Area (000 feddan)**	**% of total**
Saini	413.3	9.5
East Delta	647.7	15.0
Middle Delta	108.8	2.5
West Delta	1052.9	24.2
Middle Egypt	991.5	2.3
Upper Egypt	947.9	22.0
New Valley	948.5	22.0
High Dam	50.0	1.2
Halaib & Shalateen	60.0	1.2
Total	**4328.3**	**100.0**

Among the main reclamation projects that started in this period are:

- ? El-Salam Canal and the development of Saini with a total of 400 thousand feddans.
- ? Toshki Project, with a total of 3.3 million feddan to be reclaimed.
- ? East of Oweinat Development Project, with 189 thousand feddans for possible reclamation.

In 1991, Law No. 7 has been issued to determine the different agencies which can operate , utilize, and exploit lands owned by the state, as follows:

1. Desert Lands:

With the exception of the strategic and military regions (which are identified by the Ministry of Defense and approved by the Cabinet and the President), these lands can be classifies as follows:

- ? Regions Planned for Reclamation Projects: These lands are under the supervision of the General Authority of Reclamation Projects and Agricultural Development (GARPAD).
- ? Regions Planned for Establishing New Urban Societies: These areas are under the supervision of the Authority for New Urban Societies (ANUS).
- ? Regions Planned for Tourism: These areas are under the supervision of the General Authority for Tourism Development (GATD).

Each of these authorities acts as an owner for the land under its supervision, with coordination with Ministry of Defense.

2. Dried Lakes and Ponds and River Banks:

Under all circumstances, these lands are considered as reclamation and cultivation lands, with GARPAD responsible for the management, utilization and distribution of these lands and act as an owner of these lands.

3. Idle Lands:

Local authorities in each Governorate take the responsibility of the management and utilization of these lands for construction or cultivation within the boundaries (Zimam). The governor (after the approval of the local assembly and according to the rules and regulations predetermined by the Cabinet) the basis for distributing these lands, with priority given to persons residing or working within the boundaries of the Governorate.

Reclamation of lands close-by and stretching up to two kilometers from Zimam will be according to a national plan in coordination with the respective Governorates, with GARPAD responsible about the management and distribution of these lands.

Maximum Land Ownership for Reclamation and Cultivation:

According to Law No. 178 for 1952 and Law No. 50 for 1969, the maximum land ownership for the purpose of reclamation and cultivation are as follows:

? Lands stretching up to two kilometers from Zimam and the river banks: With a maximum of fifty feddans per person (and hundred for the family). Companies and cooperatives could own over 200 feddans of lands they reclaim for the purpose of sale.

? Desert Lands:

Law No. 143 for 1981 determined the maximum ownership according to the irrigation system and water source as follows:

1. Underground water with the use of sprinkler or drip irrigation:
    - 200 feddans per person and 300 per family
    - 10,000 feddans for cooperatives with membership of over 30 members and to companies with a maximum of 150 feddan per person.
    - 50,000 for corporations.
2. Surface Irrigation, upon approval of the Minister concerned with reclamation and the minister of MPWWR and dries lakes and ponds: The maximum is half of those mentioned before.

Under all circumstances:

- Egyptian share should not be less than 51 percent of the companies capital and the shares per person should not exceed 20 percent of capital.
- Public Sector Companies are not subject to a maximum.
- Does not include lands other than desert lands.

The third chapter deals with the distribution of lands for reclamation and cultivation during the different stages as follows:

1. 1952 to 1960:

The Permanent Authority for Land Reclamation (PALR) distributed the lands that has been reclaimed through sale to the small and large farmers in addition to college graduates and beneficiaries. During that period, PALR distributed the following areas:

Type of Farming	Area (Feddans)	No. of Farms
Small Farmers	3885	325
Big Farmers	4636	33
Graduates	333	12
Beneficiaries	1903	497
Total	10757	867

3. 1960/61 to 1969/70:

During that period there were four different public sector authorities and organizations which were responsible for land reclamation. Areas distributed until 30/6/1971 are as follows (in thousand feddans):

No.	Region	Area	Public Organization	Sold / Distributed	Execluded	Kept with authority
1	East Delta	88.2	35.7	23.5	6.7	22.4
2	Middle Delta	153.7	128.6	3.6	---	21.5
3	West Delta	289.0	194.1	30.8	---	64.1
4	Middle Egypt	77.4	62.9	10.0	---	4.5
5	Upper Egypt	74.2	50.8	9.6	0.8	13.0
	Total	682.6	472.1	77.5	7.5	125.5

Public sector organizations which were responsible for the cultivation of the reclaimed lands were not successful due to lack of experience in operating new projects with new irrigation , drainage and leveling systems in addition to the great deficiency in machinery and human power to cope with the increased areas to be cultivated.

4. 1970/71 to 1979/80:

During this period, very little land reclamation was executed due to the economic conditions after 1967 war and the preparation for the 1973 war and the increased government spending on the rehabilitation of the regions affected by the wars, especially the Suez canal and Saini zones. However, great efforts were made to reconsider and re-evaluate the agriculture policies including the land reclamation and cultivation policies. About 1015 graduates received about 25 thousand feddans, classified as follows:

Region / stage	Planned Area (feddan)	Actual Area (feddan)	Number of graduates
31/12/1976:			
El-Nahda	4752	3968	144
El-Hamoul	1071	972	40
San El-Hagar	17973	1445	55
El-Tahaddi	5439	3222	126
Sub-Total	13235	9607	365
31/12/1976:			
El-Nahda	2814	2822	95
El-Hamoul	99	99	4
El-Tahaddi	13367	10149	441
San El-Hagar	620	329	13
Middle Egypt	3553	1699	97
Sub-Total	20453	15098	650
Grand Total	33688	24705	1015

5. 1980 to 1987:

The 143 law for 1981 was issued concerning the desert lands, aiming at:

- ? Expansion in land reclamation to meet the increased food requirements.
- ? Avoid the negative experiences faced in land reclamation before.
- ? Priority should be given to the most responsive lands due to the limited water resources available .
- ? Sprinkler and drip irrigation systems are to be preferred in order to increase the efficiency of water utilization.
- ? The state role will be limited to the basic infrastructures with the private sector to utilize these lands.
- ? The planning and execution of the basic infrastructures will be limited to GARPAD.
- ? The private sector is encouraged to participate in reclamation and cultivation through subsidized loans and tax exemptions.
- ? Land cultivation and utilization should be determined before cultivation.
- ? The distribution of reclaimed lands should realize returns that could be re-spent on land reclamation.

On 25/2/1985, the Egyptian Government announced the sale of 218.7 thousand feddans for reclamation, as follows:

- About 105,600 feddans to be sold to the private sector, with the government providing the basic infrastructures while the private sector would undertake the reclamation activities.
- About 24,840 feddans with all the infrastructures and reclamation, to be distributed to individuals of the social groups.

- About 88,300 feddans to be auctioned by land reclamation companies after the completion of the infrastructures and reclamation.

6. 1986 to 1997:

During this period, the Government policy aimed at:

? Encouraging the Arab capital to be used for land reclamation and cultivation by changing item 12 of Law 143 for 1981 to treat Arab persons similar to Egyptians.

? Encouraging citizens to form reclamation companies, by changing item 11 of Law 143 for 1981 to make it possible for five persons instead of twenty to form a company.

? Extend the exemptions given to reclamation of desert lands in Law 143 of 1981 to include lands within the two kilometers outside the boundaries (Zimam).

? Increased limitations on the establishment of new reclamation cooperatives due to the problems they face.

7. The Current and Future Periods:

The Egyptian Government policy is currently encouraging the expanded role of the Egyptian, Arab, and foreign persons to reclaim and cultivate lands in the big national reclamation projects in Saini and Upper Egypt (Toshki and East of Owainet). As a result, Law No. 8 for 1997 has been issued to provide guarantees and incentives.

The fourth chapter presents some statistics that indicate the evolution of agricultural production in the new lands. The following table compares the yield of some crops in the old and the new lands.

Crop	Unit	New Lands		Old Lands
		Extension	Farmers	
Winter Season:				
Wheat	Ardeb	19.0	14.0	15.2
Broad Beans	Ardeb	8.9	6.8	5.6
Summer Season:				
Cotton	Kintar	7.4	6.3	7.9
Sorghum	Ardeb	26.6	19.8	13.4
Rice	Dariba	3.9	2.9	3.4
Peanuts	Ardeb	17.4	14.8	16.4
Sesame	Ardeb	5.1	3.9	3.8
Sunflower	Ton	0.7	0.6	0.9

The fifth chapter surveys the different companies and institutions the dealt with land reclamation. The sixth chapter presents the obstacles and limitations of land reclamation in Egypt, which can be summarized as follows:

1. Problems related to water resources and drainage system:

Some plots suffer from irrigation water shortage, especially near the end of the irrigation canals. This is the result of the use of water by squatters who were not planned to use the water from these irrigation canals; the use of surface irrigation instead of sprinkler or drip irrigation which was originally planned; cultivation of crops other than planned crops which in turn require more irrigation water like rice and forage crops. This water shortage reduces yields and reduces the cultivated area out of the reclaimed. The unavailability of efficient drainage system or the lack of maintenance of the existing systems, especially in areas using surface irrigation or use more water for leaching the salts, or in areas where the water table is relatively high which causes deterioration in the quality of the soil by increased salinity and desertification

2. Problems related to social and extension services:

New lands suffer greatly from lack of basic and necessary infrastructures and services which affects severely the stability of the settlement in these new areas. Lack of efficient security limits high investments. Little research and extension services are planned for the new lands even though these lands are in great need for more efforts in research and extension because of the diverse characteristics of these new lands.

3.Problems related to finance, marketing, and agricultural processing:

Land reclamation has become a very expensive activity requiring tremendous amounts of financial resources. New lands suffer from lack of financial institutions to provide farmers with loans at subsidized interest rates or grace periods to achieve marginality. The markets are non-existing in the new lands and producers have to find markets in the big remote urban centers, increasing the role of middlemen and thus reducing their profit margins. Lack of sorting, grading , and packing stations in these areas limit efficient marketing and affect negatively farmers income.

4. Problems related to the legal, managerial, supervision activities:

Law No. 143 for 1981 provides three years of rent for land to be reclaimed, with a promise to give title to ownership if reclamation is proceeding at acceptable rate. The law also specified certain period for cultivation and according to a program and regulations.

The sixth chapter presents the history, budget, area of responsibility and the functions of the different companies that were responsible for land reclamation.

The last chapter of the book is concerned with a summery of land reclamation projects, especially their location and size according to the Principal Plan for Land Resources of 1986. In addition, the projects that have been completed or still under execution, are summarized as follows:

Region	(000) Feddan
1. East of Delta	573400
2. Middle of Delta	246260
3. West of Delta	833884
4. Middle of Egypt	149600
5. Upper Egypt	132502
6. North-West Coast and New Valley	285820
7. Saini	331608
8. Other Areas	18341
Grand Total	**569.9**

? **Ministry of Agriculture and Land Reclamation," <u>Strategy for Horizontal Expansion until 2017</u>", General Authority For Reclamation Projects and Agriculture Development, 1996/97.**

This is a book of 265 pages of the big size, out of which 180 pages are concerned with the full detailed description of the 111 locations planned for reclamation all over the country, distributed over East Delta, Middle Delta, West Delta, Middle Egypt, Upper Egypt, New Valley, and Saini, with suitable maps for these locations. This is followed by proposed crop rotations for these different locations and technical and economic feasibility study for the proposed cropping pattern and marketing system for the South Wadi Project (Upper Egypt).

? **Ministry of Agriculture and Land Reclamation (MALR), International Fund for Agricultural Development (IFAD), and New Lands Agricultural Services Project (NLASP),"<u>New Lands Agricultural Services Project - Appraisal Report</u>", 1994 (English).**

The report includes seven chapters in 75 pages, covering the following topics:

1. Project and Sectoral Background: Including Background; Country and Agricultural sector background; Land reclamation in Egypt, IFAD's strategy in Egypt; IFAD's operation in Egypt; and Lessons learned.
2. The Project Area: Including: Location; physical resources; Irrigation systems; Drainage ; Farming system and land use; support to agriculture; and agriculture credit.
3. The project: including: The target group; Rationale, Objectives, The project summery; Project details; phasing; project costs; Finance; Procurement; Disbursements; and Environmental Impact.
4. Organization and Management: Including: Non-credit activities; Credit; Inception workshop; Annual work plans; Reports, accounts and audit; Mid-term review; and Completion report.
5. Production Markets and Prices: Including: Production and markets; Prices; and Financial analysis.

6. Benefits and Justification: Including: Benefits and beneficiaries; Prices; and Risks.
7. Assurances and Agreements to be sought.

? **Ministry of Agriculture and Land Reclamation (MALR), International Fund for Agricultural Development (IFAD), and New Lands Agricultural Services Project (NLASP)," Brief Summery of Project Main Features, Objectives and Achievements Realized Since its Start (January 1994 Till July 1999", August 1999 (English).**

The main objective of the project was the sustainable improvement of farm incomes of small holder settler families in newly reclaimed areas, thereby contributing to the overall development of the new lands. The target group was estimated to comprise about 35550 small farm families (potentially 170000 persons) selected and settled by the Egyptian Government on small irrigated farms in the desert of West Nubaria region, covering a total area of about 188 thousand feddans. The project activities were:

1. Male/female Farmers Training: A training plan focused initially on providing basic agricultural information and skills but later on more on in-depth training in a spectrum of production related subjects.
2. Demonstration Plots: The project implemented 754 demonstration plots during five years for a selection of agricultural practices and techniques practicable profitably in the project area.
3. Extension Campaigns: Six extension campaigns were implemented benefiting a total of 12509 farmers, aiming at achieving a number of crop-specific strategic objectives.
4. Extension booklets: A total of 17 extension booklets covering various agriculture/livestock production activities were produced. In addition, extension excursion, extension meetings, and field days were held.
5. Water Management: The project helped in increasing the efficiency of the available irrigation system, facilitating provision of adequate irrigation water, and establishing Water Users Association for the tertiary and on-farm water system management.
6. Credit: The project provided farmers with 6198 production or investment loans, with a value of about LE 52 million, on both short and medium terms.
7. Adaptive Research: The project performed a spectrum of ongoing adaptive research activities that are designed primarily to address such production problems specific to the newly reclaimed desert lands.

The following table presents the project impact:

Indicators	Before Project	By Project End
1. Cropping Intensity:		
Winter Season	78 %	95 %
Summer Season	64 %	90 %
2. Cropping Patterns:	Sum. Avg. Win.	Sum. Win.
Field crops	76% 86% 92%	30% 50%
Vegetables	20% 10% 4%	40% 20%
Fruit trees	4% 4% 4%	30% 30%
3. Inter-cropping:		
Pre-fruitful stag	2 %	95 %
After Fruitful age	zero	75 %
4. No. of Livestock Units:	0.30	2.00
5. Crop Yields:		
Main Winter:		
Wheat	0.70 ton	1.8 ton
Faba Beans	0.45 ton	1.5 ton
Alfalfa	6.00 ton	16.0 ton
Peas	0.70 ton	2.4 ton
Main Summer:		
Maize	0.60 ton	2.4 ton
Groundnuts	0.23 ton	1.2 ton
Potatoes	1.70 ton	4.5 ton
Tomatoes	2.00 ton	7.0 ton
6. Pressurized Irrigation Water through:		
Portable Sprinklers	90 %	50 %
Fixed Sprinklers	2 %	22 %
Drippers	3 %	25 %
Surface	5 %	3 %
7. Graduate farmers absentee ratio:	72 %	7 %
8. Disposable Income/ holding/year	LE 2567	LE 8320

? **Nasser, Ahmed A.," Economics of Land Reclamation and Cultivation in Egypt", Ph. D. thesis, Assyout University, 1994, (Arabic).**

The main objective of the research was to survey the different stages of land reclamation in Egypt in relation to the different policies of land reclamation. In addition to the secondary data, the study collected primary data from a sample of 102 farms in Assyout Governorate to estimate the rate of return on investments in land reclamation. The main findings of the study were:

1. The participation of the private sector in land reclamation was highly limited before the eighties, but even in the eighties, it was much below the planned rate.
2. By the beginning of 1987/88, land reclamation was based on the availability of irrigation water.
3. Land reclamation has to go through three different phases: a) the search, study an plan of projects, b) the execution of the physical reclamation of the soil, and c) the cultivation or the exploitation of the land.
4. From 1882 to 1952, only 400 thousand feddans were reclaimed, at 5.2 thousand feddans per year. From 1952 to 1970/71, about 912 thousand feddans were reclaimed at 45.6 thousand feddans annually. From 1971/72 to 1981/82 128.7 thousand feddans were reclaimed at 11.7 thousand feddans annually. In the first five-year plan (1982/83 - 1986/87), about 282.3 thousand feddans were reclaimed while in the second plan (1987/88 - 1991/92) about 737.4 thousand feddans were reclaimed.
5. Currently, land reclamation is the responsibility of: a) the General Authority of Reclamation Projects and Agricultural Development (GARPAD) and the Holding Company for Land Reclamation (HCLR). The first is responsible for preparation of the general plan and carrying out technical and economical feasibility studies for reclamation in addition to planing the infrastructures. The second supervises six companies that undertake the actual execution of the engineering activities of the reclamation.
6. The general plan for land reclamation in Egypt indicates that 2.6 million feddans could be reclaimed, out of which 2.4 million depend on Nile water while and 200 thousand on the underground water.
7. Land reclaimed until 1990/91 amounted to 2.4 million feddans, out of which 450 thousands reached marginality, representing 18.8 percent of total reclaimed area, contributing about 3.8 percent of the total agricultural production in 1982/836.8 percent in 1990/91. According to the 1977 water master plan the reclaimable area could reach 2.8 million feddans while the land master plan of 1985 is limited at 2.6 millions.
8. Investments in agriculture decreased from 26.1 % of total investment on the national level in 1960/61-1964/65 to 8.9 % in 1975/76-1981/82 and 10.8 % in 1987/88-1991/92. Investments in land reclamation and cultivation decreased from 39.2 % of the agricultural investments in 1960/61-1964/65 to 26.0 % in 1975/76-1981/82 and to 41.7 % in 1987.88 -1991/92.
9. The Internal Rate of Return varied from 16.3 % to 21.6 % (19.6 % on the average) with a pay-back period of five years.

II WATER AND LAND RESOURCES

? **Ahmed, Mohamed S.,"** **Economic Study for Increasing the Utilization Efficiency of Irrigation Water in the Arab Republic of Egypt", Ph. D. thesis, Al-Azhar University, 1994 (Arabic).**

The study aimed at: Investigating the current and prospectives of water resources and the efficiency of utilization of this scarce resource in order to explore means of increasing its efficiency. To achieve this, the roles of the irrigation, agriculture, and other water users have to be reconsidered. The main findings of the study are:

1. The necessity of expediting the control of the water flow and reduce water losses reaching 50 billion cubic meters annually in the Equatorial zone and 18 Billion c.m. at the Ethiopian and south of Sudan sectors of the Nile (adding up to 68 billions); losses due to evaporation from the High Dam Lake, reaching 10 Billion Cubic Meters (c.m.); Leakage and evaporation along the Nile and irrigation canals, reaching 12.5 c.m. in addition to the losses from the irrigation canals until the fields and the application of too much water than the recommended amounts (for sugar cane, water used amounted to 22 thousand c.m. per feddan while the recommended amount is 10 thousands).
2. The various projects in the Equatorial region and South of Sudan, would increase water supply by 50 billion c.m. annually, out of which the share of Egypt would reach 17.5 billion c.m. on the average (ranging between 15.2 billion c.m. and 21.0 billion). This would increase the area cultivated by 1.3 to 1.8 million feddan (based on an average water use reaching 12 thousand c.m.).
3. The various projects within the Egyptian boundaries would include:
   - ? Storing Nile water in the western depression, mainly El-Rayan and Wadi El-Natroun.
   - ? Storing in the Nile, requiring consolidation of the various barrages along the Nile and establishing new barrages at Isna.
   - ? Storing in the Northern Lakes (El-Burullus and El-Manzalah), requiring the establishment of a canal from Rashid branch to transport 1.3 billion c.m. to El-Burullus lake in addition to 0.9 billion of drainage water. Out of this amount, 1.5 billions would be used for the irrigation of the adjacent agriculture land. Another canal would be established from Damietta branch to El-Manzalah lake to transport 1.0 billion c.m. in addition to 0.8 c.m. from drainage water. Out of this amount, 0.8 billion would go to Salam canal. Both projects would require the establishment of bonds around the lakes at 1.5 meter height and 20.0 meters width to protect the fresh water from the Mediterranean salty water. This means that the project is highly costly without solid economic feasibility study in addition to several health, social, biological, and economical constraints attached with such project.
4. In the early nineties, estimates were made with respect to the reuse of agricultural drainage water, to reach 14.0 billion c.m. However, salinity in the drainage water increases from south to north and on the East and West of the Delta due to increased salinity of the soils. Classifying this water according to salinity indicates that:

- ? About 50 % of the drainage water contains less than 1500 part per million.
- ? 29.6% contains more than 3000 parts per million.

5. The reuse of drainage water for irrigation in the Delta region was estimated at 2.6 billion c.m. out of total water use reaching 15.8 billion as an annual average during the period from 1972 to 1980, increased to 2.8 out of 15.9 billion during the period from 1984 to 1990.
6. Rain fed and flood irrigation agriculture could depend on 1.4 billion c.m. annually, out of which 400 million in North Saini, 700 million in the North West Coast, and 300 million in North Delta.
7. Underground water in the valley and delta depend on the recharge from the Nile reaching about 5.5 billion c.m. annually, out of which about 1.6 billions are extracted from the wells widespread throughout the agriculture land. Underground water is affected severely by the salty water in the Mediterranean and the Suez canal. The underground water south of Delta is highly suitable for irrigation as the salt content is about 1000 parts par million, but increases eastwards, westwards, and northwards.
8. Sewage water that is dumped in the agricultural drainage canals is estimated at 1.5 billion c.m. annually which is expected to increase to 2.8 billion, some of which is mechanically treated.
9. The possible land reclamation projects that could benefit from the increased efficiency of water resource utilization are:
    - ? About 33 thousand feddans of permanent irrigation around High Dam lake at altitudes ranging between 180 and 185 meters above sea level, 63 thousand feddans for summer cultivation, and 159 thousand feddans to be cultivated 3-6 months per year. Lands above 185 meters would be difficult to irrigate unless equipped with lifting pumps.
    - ? Cultivation of land in the northern lakes to prevent the leakage of salty water from the Mediterranean. The estimated area is about 300 thousand feddans in addition to about 156 thousand feddans of the adjacent lands.
    - ? Areas around El-Salam canal, reaching 600 thousand feddans, out of which 200 thousands west of the Suez canal as a first stage while the second stage of 400 thousands are east of the Suez canal from Rommanah to Areesh.
10. Cropping pattern can help in increasing the efficiency of utilization of the water resources through the cultivation of crops with high tolerance for water salinity, drought resistant, or early maturing crops.

- ? **El-Kholy, Elham H.,” <u>An Analytical Study for the Demand for the New Land in Egypt</u>”, Ph.D. thesis, Ain Shams University, 1994 (Arabic).**

The main objective of the study were: a) To analyze the demand for the new agricultural land especially the demand for investors for land sold in auctions. b) Identifying the main factors affecting this demand like economic, social, political and legal factors. c) Examining the main obstacles that face new investors in the reclamation of new lands. The study was based mainly on the information collected from 21 auctions during the period from 1986 to 1990 in different locations and with different irrigation systems. The main findings are:

1. Since 1952 and up to 1978, the reclaimed lands amounted to 912 thousand feddans, mainly in the West of Delta region (Nubaria), followed by another 153 thousand feddans during the period 1978-1982. This land reclamation and consequently cultivation was operated by state farms and public companies.
2. Due to the increased population growth, the Egyptian government included in the 1981/1982 - 1986/1987 plan the reclamation of about 637 thousand feddans, out of which only 248 thousands were realized. About 688 thousands were reclaimed during the second five-year plan, 1987-1992, and about 872 thousands during the third plan, 1993 - 1997.
3. New lands were classified into new-old land and new-new land. New-old lands include areas reclaimed during the sixties and seventies, where all the infrastructures in addition to the internal reclamation at the level of the per feddan were executed, amounting to 912 thousand feddans. New-new lands include only the areas reclaimed during the eighties where only the main infrastructures were executed.
4. Main factors affecting the demand for new lands are mainly economic (price of land, interest rate, and inflation rate in addition to taxes and the net revenue expected from the land); political or legal (Law No. 142 for 1981 regulating the exploitation and ownership of agricultural lands and Law No. 116 for 1983 prohibiting the scraping or the misuse of the agricultural lands).
5. The price elasticity of investors demand for the new lands purchased through auctions is equal to unity (Unitary elastic), with supply of new lands is in excess of investors demand for the new lands.
6. The deficit in investors demand for the new lands is due to the following factors:
    - ? Higher prices for new lands sold through auctions than the price of allocated lands to other investors.
    - ? Complicated regulations for the ownership of reclaimed lands requiring investors to go through several steps and different government offices, which is considered as waste of time and effort.
    - ? Lack of marketing facilities in the new lands.
    - ? Lack of social services, like electricity, drinking water, transportation, communication, security, roads, and education institutions.
    - ? High risk involved in the cultivation in the new lands.
    - ? Investors purchasing lands through auctions do not enjoy the same benefits like those investors or exempted persons with allocated lands (the down payment, the number of installments, availability of credit, interest rate, and grace periods).
    - ? Lack of coordination between ministries and offices within each ministry with some relation to land reclamation.

? **El-Mahy, Mohamed M.,” <u>Economics of minimizing the use of irrigation water in cultivating field crops in West Nubaria with the current irrigation systems</u>”, Alexandria Journal of Agricultural Research, Vol. 37, No. 3, December 1992 (Arabic).**

The study aimed at the determination of the optimum cropping pattern that minimizes the use of available water resources in west of Nubaria region using the current irrigation systems. The study applied linear programming technique using secondary data and

primary data collected from 150 farmers in the area representing 5.2 % of the total number of farmers. The two main irrigation systems used in the region are surface and sprinkler irrigation. The main findings of the study are:

1. Sprinkler Irrigation System:

The current cropping pattern includes 17 activity while the optimum cropping pattern includes 10 activities yielding net revenue per feddan about 5.9 percent higher than that of the current pattern. The optimum pattern also minimized water utilization by 16.8 % in addition to the reduction in the other input uses reaching 1.0 % for labor and 1.3 % for nitrogen fertilizers. The limiting factor in this situation is water resources during the months of December, April, and June with a shadow price (marginal value product) equal to LE 5.5, LE 1.3, and LE 4.4 for the three months respectively.

2. Surface Irrigation:

The current cropping pattern includes 15 activities while the optimum cropping pattern includes 7 activities and realizing a net revenue per feddan about 23.2 % higher than that of the current pattern and reduces the use of water resources by 24.6 % in addition to the reduction in the use of labor input by 11.9 %, labor input by 14.8 %, nitrogen fertilizers by 10.3 %, and phosphorus fertilizers by 42.7 %. The limiting factors in this case are water resources during the months of November and March, with a shadow price per unit of water equal to LE 3.9 and LE 6.5 respectively.

? **Hassan, Haytham A.,” Economics of Modern Irrigation Systems in the Reclaimed Lands in A.R.E.”, M. Sc. thesis, Ain Shams University, 1993 (Arabic).**

The study aimed at investigating the possibility of using modern irrigation systems in the newly reclaimed lands leading to more efficient use of the limited water resources. Secondary data from the different organization related to this issue were used in addition to primary data collected from Bustan region, West of Nubaria. The main findings of the study are the following:

1. Traditional methods of irrigation are inefficient, leading to deterioration in the soil fertility and declining productivity with increased problems of drainage.
1. Land reclamation declined during the 1958-1966 period at 1.7 thousand feddans annually but increased by 45 thousand feddans annually during the period up to 1989.
2. Possibilities for land reclamation indicate that 3.5 million feddans could be developed, out of which 2.9 million would depend on water from the Nile, with water lifting up to 150 meters. About 570 thousand feddans would depend on underground water. Irrigation projects in the 1987-1992 five year plan indicate that water from the Nile account for 99.96 % of the water resources required for irrigation for the newly reclaimed land. The national budget would finance 87.5 % of the required investments while the remaining 12.5 % would be covered by cooperatives and the private sector.
3. In the 1992-1997 five year plan, the water resources available for the different uses are as follows: 55.5 billion cubic meters from the Nile annually, 4.2 billion from the

agricultural drainage, 2.9 billion from underground sources, 1.2 billion from rain, 7.5 billion as the Egyptian quota of the high dam storage, in addition to 2.3 billion from the reuse of agriculture drainage, with total of 66.2 billion cubic meters as annual available water resources. Agriculture is the main user of the water resources, reaching 49.7 billion annually, followed by 3.3 billion for municipal uses, 2.2 billion for industrial uses, and 4.0 billion for navigation, electricity and balances.

4. By the year 2000, the water resource requirement for the different uses would reach 95.0 billion cubic meters. This led to more investigation for more efficient systems of irrigation.
5. In the new lands, sprinkler irrigation is more efficient for the cultivation of broad beans, peas, onions, tomatoes, wheat and maize, with efficiency rate of 70.0 %. Drip irrigation is more efficient for the cultivation of citrus, olives, grapes, onions, tomatoes, potatoes and seed melons, with efficiency rate of 85.0%. The use of modern systems for irrigation would save about 3.0 billion cubic meters annually.

? **Osman, Mohamed A., "Economics of Utilizing Alternative Sources for Irrigation Water in Agricultural Production", Ph.D. thesis, El-Minya University, 1993 (Arabic).**

The main objective of the study was to investigate the economics of using the agricultural drainage and the underground water as alternatives for the Nile water and rain for the northern coast and Saini. To study the case of drainage water, El-Hamoul District of Kafr El-Sheikh governorate was selected a case for study where irrigation research institute and drainage research institute have taken soil samples from three different areas, the first uses only drainage water for irrigation, while the second area uses mixed water all around the year, and the third uses fresh water all around the year. Main crops cultivated in the area were sugar beets and wheat as winter crops and rice and cotton as summer crops. The net return per cubic meter of irrigation water and the returns per pound spent on irrigation were estimated to indicate the efficiency of the irrigation system. The main findings of the study are:

1. The value of production and the net returns per feddan for all crops under study were lower in the fields irrigated with drainage water than the mixed or fresh water.
2. The net returns per cubic meter of irrigation water and the net returns per pound spent on irrigation were lower for all crops raised in the fields irrigated with drainage water than those of the mixed or fresh water.
3. In the case of wheat, the value of production per feddan irrigated with mixed water and that with fresh water were 9.4 % and 23.8 % respectively higher than that irrigated with drainage water. The returns per cubic meter of irrigation water were 5.2 % and 44.7 % higher for mixed and fresh water respectively than drainage water. Similarly, the net returns per pound spent on irrigation were 10.6 % and 17.0 % higher for mixed and fresh water respectively than that of the drainage water.
4. For rice, similar results were obtained as the value of production per feddan irrigated with mixed and fresh water and the returns per cubic meter of irrigation water were 29.1 % and 66.1 % higher than that of drainage water. Moreover, the return per

pound spent on irrigation with mixed and fresh water were 30.1 % and 142.7 % higher than that for drainage water.

5. For cotton, there were no great differences as the value of production per feddan for mixed and fresh water were respectively 10.1 % and 20.1 % higher than that of the drainage water. Similarly, the net returns per cubic meter of irrigation water were 11.8% and 29.4 % higher and the net returns per pound spent on irrigation were 5.0 % and 11.4 % higher. This small differences might indicate that cotton tolerate more the non-fresh water.
6. Statistical tests (T-test and F-test) gave significant differences among the three types of water in the case of wheat, rice, and sugar beets. In the case of cotton, there were no significant differences.

? **Shalaby, Abdel-Rahman M.," Egypt's Water Resources Policies And Management", Agriculture Policy conference, Ministry of Agricultural and Land Reclamation and U.S.AID, March 26-28, 1995, (Arabic).**

The paper indicated the following points with respect to the use of water resources in Egypt:

1. Although High Aswan Dam has completely controlled the River Nile flow down stream Aswan with total guarantee of 55.5 billion cubic meters annually a lot of control works, run-off and flow management have been seen as promising works to make benefits and better use of from Nile catchments and watersheds potentialities in the Upper Nile Basins, in which these projects stipulated in 1959 treaty between Egypt and Sudan, in the Equatorial and Sobat Basins have been realized. These foreseen projects are Jonglei Canal (phase I and II), to minimize losses of Bahr El-Gebel and El-Zeraf and control the flow to Sudd Area and control the flow of lake Albert. Another project is foreseen for Bahr El-Ghazal Sudd Region to minimize losses in the swamp areas by constructing two diversion canals (Northern and Southern ones). The third promising project is in the River Sobat Basin and Machar Marches. These projects could result in saving and developing about 18.0 billion cubic meters (c.m.) annually for Egypt and Sudan. Unfortunately, these projects could not be implemented due to unrest and political reasons.
2. With respect to the underground water, the Water Research Center has proved the following facts:
    - ? Wadi El-Nile, a Nile Delta is a proper aquifer, renewable by seeps from condensed irrigated old lands. Recharging is within 9-10 billion c.m. annually. Safe extraction is estimated to be Bout 5.5 billion c.m. annually. The estimated extraction is within about 3.2 billion.
    - ? The Nubian Sandstone aquifer in western desert (fossil almost un-renewable) is a rich resource with good quality with safe and economical extraction potentialities of about 3.6 billion c.m. annually. The extraction so far is within 570 million c.m.
    - ? In Wadi and Delta Fringes and Edges: The total safe extraction is within 2.0 billion c.m. The total extraction is within 1.4 billion. Most of the reserve is in

Nile Valley Edges, but the West and East Delta have already almost fully utilized.

? In Saini and Coastal aquifers and Wadies: There are potentialities in the coastal and wadies shallow aquifers of about 230 billion c.m. and of another 200 billion in the Nubian sandstone aquifer in Saini. Most of the coastal and shallow aquifers in the west and east Mediterranean have been completely utilized.

3. Reuse of Drainage water: Agriculture drainage water amounts to 11.0 billion c.m. with salinity ranging between 800-5000 p.p.m. This important source could play a good role to alleviate water shortage in Egypt due to the low investments needed for construction and operations. The main problem facing this source is pollutants and misuse. The amount foreseen to be utilized is in the range of 7.0 billion c.m., taking into consideration the water quality and salinity concentration. About 4.6 billion c.m. is estimated to be in use. A national program should be in force to conserve this resource from the quality point of view in collaboration with all concerned bodies. Another source in this field is the sewage treated effluents . The total effluents foreseen in the future for big cities in the Nile valley and Delta could reach about 6.0 billion c.m. including about 2.8 billion from greater Cairo.
4. It is foreseen that the water amount needed around the year 2000 would be 72.0 billion c.m. including that needed for new land of about one million feddan . The extra water needed would be from aquifers, reuse of drainage water, irrigation improvement, and better water management and utilization. For long term traditional, non-traditional, and Upper Nile projects have to be conducted and developed.
5. The following is a list of the present and future planned water resources in Egypt, in billion c.m.:

S o u r c e	**Present**	**Future**
Nile Water Treaty	55.5	55.5
Upper Nile Development	----	9.0 *
Reuse: Agriculture Drainage	4.6	7.0
Treated effluents	----	2.0
Aquifers	5.2	11.8
Irrigation improvement and proper management	-----	5.0
Total	**65.3** **	**90.3** ***

* Upper Nile Development is foreseen as a long term strategy.

** Including irrigation, municipal, industrial, and Sahara requirements.

*** Is to be available steadily with time.

III CROPPING PATTERN AND PRODUCTION ECONOMICS

? **Abdel-Aal, Abou Hashim A.," <u>An Analytical Study for the Performance of Agricultural Cooperatives in the Reclaimed Lands in the Arab Republic of Egypt</u>", Ph.D. thesis, Al-Azhar University, 1994, (Arabic).**

The research work aimed at investigating the performance of the agricultural cooperatives in the reclaimed lands within the old land through a sample of 32 cooperatives and 161 farmers-members of these cooperatives including beneficiaries and graduates. The main findings of this research work can be summarized as follows:

1. One of the main limiting factors for the performance of these cooperatives is the low quality of the soils reclaimed. About 73 % of land planned for reclamation until the year 2000 are third ands fourth class soils and about 53 % of the reclaimed lands are salty soils. Reclamation of these lands is planned to depend mainly on the use of about 7.2 billion cubic meters of agricultural drainage water that might have negative impact on the soil and on the environment pollution in the long run.
2. Agricultural cooperatives should play an important role in the process of economic reform, especially for the marketing activities of these small farms, where 48 % of farmers operate less than one feddan farms, in order to prevent monopolistic activities that flourish during the reform process.
3. The main function of these cooperatives is the procurement of farm inputs (seeds, chemical fertilizers and pesticides); providing credit and marketing of the main farm products (cotton, rice, sugar cane, and peanuts. It was clear that the cooperatives were not able to meet the requirements of their members, especially in chemical fertilizers and seeds, as they handled either more or less than the quantities required due to lack of good planning in advance. Credit is limited only to crop service loans. Short and medium term loans are not provided, with the exception of El-Hamoul region, north of the Delta. Marketing is limited to cotton and rice with problems related to sorting, grading, and pricing.
4. After 20 years of cultivation after reclamation, there was significant difference in the productivity between old and new lands with respect to cotton and rice. The low productivity of the new lands is due to poor irrigation and drainage structures and high soil salinity. Higher productivity of sugar beets was realized for the new lands as it tolerates higher salinity than other crops.

? **Abdel-Aziz, Mahmoud A.," Impact of Types of Holders on the Efficiency of Production in New Lands in Egypt", Ph.D. thesis, Cairo University (Fayoum), 1992, (Arabic).**

The objectives of the research work were:

1. To study the economic efficiency of production of main crops in newly reclaimed lands.
2. Explore the main difficulties and obstacles that face holders, and
3. Study the role of the government in facing the main limitations of land use and exploitation.

The study was based on a stratified random sample of 115 farmers in Bustan area representing different types of holders, out of which 62 small farmers, 25 new graduates, 13 others , and 15 investors. Land in this area was distributed to five different producers,

small farmers, new graduates, investors, public sector companies, and others who mostly are former government employees. The main findings of the thesis are:

1. The area cultivated by alfalfa was about 50 percent of the total winter cropped area while vegetables, maize, and summer alfalfa was about 49 percent of the summer cropped area.
2. As average of 1980-89, productivity of barley, sorghum, sesame, vegetables, and peanuts were close to that of the old lands. Small farmers, investors and others were more efficient than new graduates.
3. A great deal of the agricultural products are sold by all farmers to wholesalers while small farmers consumed a larger proportion of their production than other producers.
4. The main factors affecting agricultural production in this area was human labor, nitrogen fertilizers, and manure. All types of landholders did not reach the production level that maximizes profit. The proportion of farmers realizing minimum average production costs amounted to 62.5 % in wheat, 63.2 % in beans, 51.0 % in peanuts, 78.3 % in sesame, 92.0 % in maize, 38.8 % in watermelon, 51.7 % in peas, 57.7 % in tomatoes.
5. The main social problems are poor service institutions such as public food stores, post offices, poor means of transporting agricultural commodities to the market. The economic problems relate mainly to the unavailability of financial resources, certified seeds, in addition to marketing problems.

? **Abdel-Hadi, Mohamed A., "Economic Study For The Modern Irrigation Systems in The Desert Lands of Arab Republic of Egypt", M. Sc. thesis, Al-Azhar University, 1996 (Arabic)**.

The main objective of the study was evaluation of the modern irrigation systems in the newly reclaimed desert lands. The study was based on primary data collected from producers using Nile water in Salhya, Tahaddi in South Tahrir, and Bustan in Nubaria and producers using underground water in Intlak, Sadat City, and Wadi Natroun. The main findings of the study were:

1. The farm size varies in the sample of producers using Nile water from 5 to 100 feddans.
2. In the Nile irrigated farms, the per feddan construction cost and the annual operational costs for the fixed sprinklers used for fruit seedlings amounted to LE 5450 and LE 583 respectively. The comparable figures amounted to LE 1448 and LE 175 for the portable sprinklers used for field crops; LE 1256 and LE 224 for drip irrigation; LE 1000 and LE 97 for pivot sprinklers; and LE 340 and LE 138 for the semi portable sprinklers.
3. In the underground irrigated farms, the construction and annual operational costs per feddan amounted to LE 1922 and LE 505 respectively for drip irrigation used for fruit trees; LE 1333 and LE 104 for pivot sprinklers; and LE 854 and LE 417 for portable sprinklers.
4. According to the ratio of net returns to the total production costs per feddan, the fixed sprinklers ranks first, followed by pivot sprinkler, drip irrigation, and semi-portable sprinklers.

5. The cost of construction for deep wells varied from LE 30 thousand to LE 53 thousand depending on the depth, type and power of the pump.

? **Abdou, Amin Ismael and Abdel-Aziz, Alaa Mahmoud, " Economic Cropping Pattern in the New Lands (Bustan and West of Nubaria), Egyptian Journal Of Agricultural Economics, Volume 3, No.2, September 1993. (Arabic).**

The study aimed at investigating the optimum cropping pattern for producers in these two regions and the reasons for variations among the different categories of producers. A sample of 115 producers was randomly selected, including 62 beneficiaries, 25 graduates, 15 investors, and 13 others during 1990/1991 agricultural year. Main crops cultivated include: wheat, broad beans, peas, and tomatoes as winter crops; and peanuts, sesame, seed melon, and tomatoes as summer crops. Profit functions were estimated to determine the optimum cropping pattern. The study indicated that profits could be maximized by changing the cropping pattern for the different types of farming as follows:

1st- **Beneficiaries:** With a farm size of five feddans or less, the optimum cropping pattern for the winter season includes 0.5 feddan of wheat, 1.2 of broad beans, 1.5 of peas, and 1.2 of tomatoes. This would increase profit per feddan by 51.7% more than the prevailing cropping pattern. In the summer season, the optimum cropping pattern includes 0.9 feddan of peanuts, 0.5 of sesame, 0.4 of maize, 1.6 of seed melons, and 1.8 feddans of tomatoes. The would increase per feddan profits by 30.5 % more than the prevailing pattern. Providing credit facilities for these small farmers is considered as essential prerequisite for realizing the required pattern for those small farmers.

2nd- **Graduates:** With 6.4 feddans as average farm size for this group, the winter optimum cropping pattern would include 1.1 feddan of wheat, 1.5 of broad beans, 1.6 of peas, and 1.2 feddan of tomatoes. This would increase profits by 71.3 % percent more than the prevailing cropping pattern. In the summer season, the optimum cropping pattern would include 1.3 feddan of peanuts, 1.5 of sesame, 1.2 of maize, and 2.0 feddans of seed melon. This would increase profits by 14.6 % more than the prevailing cropping pattern.

3rd- **Investors:** With average farm size for this group amounting to 30.8 feddans, the optimum cropping pattern for the winter season includes 3.3 feddan of wheat, 2.6 of broad beans, 2.2 of peas, and 1.7 feddan of tomatoes. This would increase profitability by 31.0 % more than that of the prevailing cropping pattern. For the summer season, the optimum pattern would include 1.7 feddan of peanuts, 2.7 of sesame, 1.6 of maize, 2.5 of seed melon, and 2.8 feddans of tomatoes. This would increase profitability by 44.2 more than the prevailing pattern.

4th- **Others:** With average size of farm for this group amounting to 13.8 feddans, the optimum cropping pattern for the winter season includes 2.4 feddan of wheat, 2.7 of broad beans, 2.1 of peas, and 6.5 feddan of tomatoes. This would increase profits by 150.9 % more than that of the prevailing pattern. For the summer

season, the optimum cropping pattern would include 1.8 feddan of peanuts, 2.7 of sesame, 2.4 of maize, 2.5 of seed melons, and 2.0 feddans of tomatoes. This would increase profits by 149.7 % more than that of the prevailing pattern.

Based on profit increases due to the adoption of optimum cropping patterns, it is clear that investors are not far away from the optimum pattern (profit increases ranging from 31.0 % to 44.0 %). This group has greater access to better technology and greater availability of farm inputs and good marketing. The last farming group (others) are very far from optimum use of their resources (profit increases are 151 % for winter crops and 150 % for summer crops. This group include previous government employees, military or police officers, the majority of which have little background in farming or they have objectives other than profit maximization. This can be considered as waste of the agricultural and economic resources of the country.

? **Abou El-Ela, Ashraf M., " Economics of New Land Reclamation", Ph.D. thesis, Suez Canal University, 1992, (Arabic).**

The research work aimed at:
a) Investigating the economic cost and value of new land. b) Variations in the investment structures in the new land due to farm size, source of irrigation water, method of irrigation. c) Estimating production costs in the new land. The study covered reclaimed areas in Ismaelia and Sharkia governorates with a sample of 100 farmers, with 50 in each governorate. In Ismaelia, farmers were selected from three locations while farmers in Sharkia were selected from two locations. The social characteristics of farmers in these locations were the main component of the research work, covering age distribution, education, other non-farm activities, social status, family size, original residence (where he came from). The main economic findings are:

1. The market price of land increased from LE 800 per feddan in 1970 to LE 5100 in 1991, at a rate reaching 25.6 % annually which explains the big demand for the newly reclaimed land even if it is not economically feasible for agriculture production. The price of land accounted for 22.2 % of direct investment in 1970, increased to 56.0 % in 1991.
2. Total investment in land reclamation is classifies into three groups: a) direct investment, including land leveling and irrigation structures for lifting, transporting, and distribution of irrigation water. b) Indirect investment, including internal electric lines, internal roads, and buildings. c) Price of land.
3. Direct investment per feddan amounted to LE 2670 on the average, but varied from 39.0 % to 51.6 % of total investment depending on the farm size. Indirect investment amounted to LE 1020 per feddan on the average, but varied from 10.4 % to 16.1 % of total investment.
4. Based on water source, total investment amounted to LE 5380 per feddan for underground water, LE 6450 for the Nile source, LE 7770 for both sources, and LE 5700 as weighted average.
5. Based on method of irrigation, total investment amounted to LE 5580 for surface irrigation, LE 5640 for drip irrigation, LE 5810 for the combined system, and LE 5640 as a weighted average.

6. Based on water source and method of irrigation, total investment amounted to LE 5360 per feddan for surface irrigation with underground water, LE 6150 for surface irrigation using Nile water, LE 7110 for the combined surface, LE 5710 for drip irrigation using ground water, LE 4230 for the combined drip irrigation, LE 4650 for the combined methods with ground water, LE 7830 for the combined methods using Nile water, and LE 8840 for the combined sources and methods.
7. Main crops cultivated in winter season are: tomatoes, wheat, alfa alfa, broad beans, and cantaloupe. Main crops for the summer season are: maize, sesame, peanuts, and watermelon.
8. The cropping pattern in the new land should concentrate on the cultivation of horticulture crops using modern method for irrigation (preferable drip irrigation) as they are high value crops while the traditional crops do not realize positive profits.

? **American University in Cairo - Desert Development Center, "Poverty and Environment in the New Lands", Ford Foundation, August 1998, (English).**

The report is laid down in 75 pages in addition to a big collection of annexes, with the following objectives:

1. to identify the main environmental problems existing in the areas of study.
2. To assess the public awareness of settlers of the existing environmental problems and their perception of their impacts.
3. To study the effects of the problem at the household and the community levels.
4. To shed lights on the dynamics of the household copping strategy with the environmental problems.
5. To identify the household socio-economic and political response to the problem.
6. To identify women's role and extent of participation in the problem.
7. To asses the local potential to solve the problem.
8. To suggest policy guidelines to mitigate resources degradation and measures to alleviate related livelihood deterioration.

South Tahrir area was selected as the pilot study site and Maryout area was selected as the main site. The study was based on recent observations that after 30 years of inception some symptoms of environmental degradation started to occur in these reclaimed lands. This situation was likely to limit the potential of livelihood improvement in such areas. This led the need to investigate the reasons and impacts of such problem and the relationship between environmental degradation and poverty. This investigation was made in two phases: the first in South Tahrir as exploratory and pilot study to test the methodology and field data collection tools while the second was the main area in Maryout. Both the pilot and the main areas are from the relatively old reclaimed lands though they have different soil characteristics and some differences in the settlement schemes. Migration to the settlement in these areas started in the late fifties and early sixties though under quite different socio-economic and political conditions. This history means that the land in these areas should have passed through all the steps of agradation process and eventually some of these lands have passed also to a degradation situation for some reason or another.

Women in these areas have been exposed daily to various kinds of environmental problems from different sources. These problems have escalated with increasing rise of water table level to the extent that it threaten their livelihood and well being of their families. The following are the main results of the study:

1. Housing Conditions:

Houses are usually supplied by potable water source, but their sanitation is basically septic tanks without any bottom lining that led to the rise of the water table and the soil water logging. If the area depends on underground water, the acquifers are now showing signs of chemical, and biological contamination as indicated by increasing levels of nitrates, ammonia, and bacterial counts. The situation gets worse during winter when rain water forms ponds in the unpaved streets and passages between the residential areas in the villages.

The houses suffering from water logging seeping up in the walls creating a continuous dampness of the house interior. The houses floors and walls are highly vulnerable to water accumulation leading to the dampness of the house. The increased numbers of mosquitoes and flies in addition to the extensive use of chemical fertilizers and insecticides to compensate infertility soil, has led to various kinds of diseases.

About 69 percent of the houses have access to electricity connections, 2 percent have generators, and 29 percent do not have access to electricity. Kerosene stoves are widely used facility for cooking. Women still rely on agriculture residues and plastics that they burn for baking and cooking when there is lack of cleaner source of energy.

2. Women's Roles and Activities:

During summer, men are forced to leave their lands fallow and travel long distances in search for jobs., leaving the responsibility of farm management to their wives . Women are also forced to work for wages either in or off-farm to support their families. In newly reclaimed lands, women assume crucial roles in most of the agriculture production activities particularly those related to food security and animal production. In Tahrir area, about 60 percent of women participate in weeding, 46 percent participate in harvesting, 45 percent participate in applying fertilizers and pesticides, 41.4 percent participate in planting, 36.0 percent participate in storing, and 34.2 percent participate in transporting farm products.

As a result of increasing soil salinity and rising level of water table the soil fertility decreased, which has been reflected in increasing the workload on women in the farm activities.

3. Family Economic Hardship:

Because of these environmental problems, farm families in Tahrir and Maryout areas could not afford the educational costs of their children, the costs of the agricultural farm production, and could not afford to pay land rent. Maryout area suffered considerable economic hardship due to the severe and chronic environmental problem.

4. Family Coping Strategy:

Women's coping strategies varies according to their household socio-economic status. Most women coping strategies have generally revolved around the preservation of

assets, an intensification of labor time, and a change in the level of expenditure and stretching the household income that may require wives to change spending patterns to deprive themselves or others of her household of vital resources. Women have been also forced to sell livestock which is an essential for the continued viability of rural households and an important source of most economic output and food production of the household. Some of the poorest women were forced to seek employment in neighboring towns and cities in their efforts to satisfy their families basic needs. This have created additional stress and health hazards as their children were left behind to receive very poor child care.

5. Perception of Community Hardship:

In Maryout areas, women were dissatisfied with the quality of the services and utilities in their communities. They support family planning and find it very important to improve the quality of the gynecological care given to them. Women in the new lands indicated that lack of health services is the first problem they suffer from as a result of the environment deterioration.

Awad, Karima A., "A Study in the Economic and Production Efficiency for major cereals in the New Lands in Egypt", Egyptian Journal of Agricultural Economics, Vol.8, No. 2, pp. 467 - 486, (Arabic).

The main objective of the study is to determine the efficiency of producing wheat and maize in the new lands of Bustan area in Nubaria. The study was based on primary data collected from a random sample of 50 producers, out of which 25 were graduates and 25 were beneficiaries, with 5 feddans as average farm size for each. On the average, about 2.0 feddans per farm were cultivated with wheat and 1.3 was cultivated with maize. The data was used to estimate a linear and log functions for each type of farming. The results can be summarized as follows:

1. For Wheat: Nitrogen fertilizers, labor input, and seeds were the most significant inputs affecting wheat production. For beneficiaries, the elasticity of production amounted to 0.316 for nitrogen fertilizer, 0.316 for labor input, and 0.175 for seeds. However, for graduates production elasticity amounted to 0.444, 0.318, and 0.144 for the three inputs respectively. Minimum average cost was attained for beneficiaries at 30 ardab per farm (about 15 ardab per feddan) while that for graduates amounted to 15 ardab per farm (7.5 ardab per feddan). Beneficiaries are therefore more efficient than graduates in the production of wheat in the new lands.

2. For maize: Nitrogen fertilizers, labor input and seeds were the most significant production factors affecting maize yields. Minimum average cost for maize production was at 26.0 ardab per farm (20.0 ardab per feddan) for beneficiaries and 23.4 ardab per farm for graduates (18.0 ardab per feddan). Beneficiaries are therefore more efficient than graduates in the production of maize.

? **El-Kheshin, Manal E., "Economics of Agricultural Production in the Reclaimed Lands in Kafr El-Sheikh Governorate", M. Sc. Thesis, Tanta University (Kafr El-Sheikh), 1995 (Arabic).**

The main objective of the study was to estimate the optimum cropping pattern for the different reclaimed lands in Kafr El-Sheikh governorate. Linear programming technique was applied in addition to analysis of variance to estimate the differences between the tenure systems. The main findings of the study were:

1. Areas reclaimed during the period 1960/61-1986/87 (with the exception of the period 1973/74-1976/77 due to the middle east war) amounted to 1351 thousand feddans, representing 22.5 % of the cultivated area at that time, reaching 6.0 million feddans.
2. By the end of 1987/1992 plan, the reclaimed area reached 2101 thousand feddans, accounting for 35.0 % of the cultivated area.
3. By the year 2000, the area is estimated to reach 2.8 million feddans.
4. The current cropping pattern in El-Mansour area of Kafr-El-Sheikh governorate includes wheat, flax, sugar beets, broad beans, onions and alfa alfa as winter crops and rice, cotton, seed melons and maize as summer crops.
5. Six models of linear programming were estimated depending on different constraints with respect to agricultural resources and farm inputs in addition to crop rotations. Water resources, labor and chemical fertilizers were the main limiting factors for maximizing farm income. Investors realized higher incomes than the beneficiaries whether with the current or the optimum cropping patterns.

? **El-Mahy, Mohamed M., "Economic Analysis for the use of Water Resources in Crop Production under Certainty and Risk in West of Nubaria", Ph.D. Thesis, College of Agriculture, Alexandria University, 1992. (Arabic).**

The study aimed at :

- Identification of the Cropping Pattern under surface and sprinkler irrigation.
- Estimation of investment costs for the surface and sprinkler irrigation systems.
- Identification of the main technical and economic obstacles for the two irrigation systems.

The main findings of the thesis can be summarized as follows:

1. The optimum cropping pattern under certainty for sprinkler irrigations increases net revenue by 17.2% over the current cropping pattern. The main limiting factors under these conditions were winter and summer land resources and water resources during the months of January, July and August.
2. Introducing risk into the program would increase net revenue by 15.3 % than the current cropping pattern. The main limiting factors under these conditions were water resources during the months of November, January and July.
3. The optimum cropping pattern under certainty for surface irrigation increased net revenue by 11.3 % than the current cropping pattern. The main limiting factors under these conditions were water resources during the months of November, December, January, March, May and August.

4. Introducing risk into the program increased net revenue 10.5 % than the prevailing cropping pattern. The main limiting factors under these conditions are the water resources during the months of January, March and August.
5. Under sprinkler irrigations, the present value of annual reclamation costs varied between LE 246.3 and LE 518.0 with the optimum cropping pattern under both risk and certainty provides higher net revenues than the annual reclamation costs.
6. Under surface irrigation, the present value of annual reclamation costs varied between LE 303.6 and LE 638.0 with the optimum cropping pattern under both risk and certainty provides higher net revenues than the annual reclamation costs.
7. Water resources is considered as the main limiting factor for production in West Nubaria for 92.3 % of farms under sprinkler irrigation, and of 87.5 % of farms under surface irrigation.
8. About 70.5 % of sprinkler irrigation farms and 84.7 % of surface irrigation farms suffer from acute problems related to factors of production especially chemical fertilizers, mainly, high prices, insufficient quantities in the inappropriate timing, lack of credit, complicated bureaucracy that delays the delivery and reduces the quality of the input.
9. About 54.0 % of farms under sprinkler irrigation and 77.5 % of farms under surface irrigation suffer from labor problems, mainly labor shortage, high wages, low efficiency, lack of transport facilities and suitable roads to bring labor force from areas with high population intensity.
10. About 70.5 % of farms under sprinkler irrigation and 83.0 % of farms under surface irrigation suffer from problems related to farm machinery services provided by the agricultural cooperatives, mainly, insufficiency of tractors, the unavailability at the appropriate timing, the high frequency of breakdowns, and inefficiency of cooperative management of farm machinery.
11. The study indicated that under both risk and certainty, the limiting factors for profit maximization under sprinkler irrigation are land and water resources. For Surface irrigation, the limiting factors are water resources whether under risk or certainty. Main obstacles faced by both sprinkler or surface irrigation systems ranked according to their relative importance are: low water level in the main canals, failure of electric power required for the operation of the pumping stations, inefficiency of the drainage system, water salinity, and lack of efficient agriculture workers.

? **El-Mahy, Mohammed M., " Estimation of Investment Costs of Land Reclamation under different irrigation systems and its feasibility", Alexandria Journal of Agriculture Research, V.37, N0. 3, (241-255), 1992. (Arabic)**

The study aimed at estimating the annual fixed costs per feddan under different irrigation systems (surface irrigation system, drip irrigation system, individual stationed sprinkler irrigation units, collective non-stationed sprinkler irrigation units, and individual non-stationed sprinkler irrigation units). The study was based on secondary data obtained from GARPAD in addition to primary data collected from 225 farmers in West Nubaria following different irrigation systems. The Discounted average annual cost in land reclamation investment was based on the Capital Recovery Factor as follows:

$$n\ I \qquad n-1$$

$$\text{Annual cost} = p\,(I + I) \;/\; (I + i)$$

where: p: the present value of investment costs.
i : the interest rate
n: the productive life of the investment.

The present value of the investment costs was capitalized using different discounting rates varying from 8.0 %to 18.0% and different productive life ranging from 20, 25, to 30 years.

The study indicated that the land reclamation costs amounted to LE 3778 per feddan under drip irrigation with annual costs between LE 336 and LE706 realizing net revenue per feddan amounting to 232 %. For sprinkler irrigations, The present value of reclamation amounted to LE 3519 with annual net revenue exceeding annual costs by 215 % in the case of individual stationed sprinkler irrigation units, LE 2773 and 276 % in the case of individual non-stationed sprinkler irrigation units, and LE 2821 and 285% in the case of collective non-stationed sprinkler irrigation units. It is clear that land reclamation under the different irrigation systems is profitable, with collective non-stationed sprinkler irrigation units ranking first , followed by individual non-stationed sprinkler irrigation units, drip irrigation, individual stationed sprinkler irrigation units and finally surface irrigation.

? **El-Meenawy, Mahmoud M., " Production Economic Analysis of reclaimed Lands with Beneficiaries and Graduates in West Nubaria", Ph. D. thesis, Alexandria University, 1992, (Arabic).**

The objectives of the study were:

One) Analysis of variable costs of production and income for the different crops produced on beneficiaries and graduate farms in West of Nubaria farms.
Two) Analysis of the annual fixed costs to estimate profitability and pay-back period.
Three) Estimating production functions for the different crops produced in the newly reclaimed lands in West of Nubaria.
Four) Identifying the main technical, economic, and social factors affecting agricultural production for beneficiaries and graduates.

In addition to secondary data, the study used primary data collected from a random sample representing 5.0 % of producers in the region under study. The main findings of this study include:

1. Beneficiary farms are more profitable than those of graduates. The ratio of annual net returns to variable costs amounted, in the beneficiary farms, to 1.2, decreased to 0.8 when only reclamation costs are included, and to 0.5 when reclamation and infrastructure costs are included. Similar ratios for the graduates are 0.9, 0.6, and 0.3.

2. Marginal revenue for land resources (opportunity costs) in the case of winter crops, for both beneficiaries and graduates, amounted to LE 828 for wheat, LE 508 for broad beans, and LE 392 for alfa alfa; for beneficiaries it amounted to LE 945 for peas, LE 1116 for tomatoes, and LE 1195 for onions; and for graduates, it reached LE 693 for barley, LE 1058 for peas, LE 769 for tomatoes, and LE 2853 for potatoes.
3. Marginal revenue for land resources (opportunity costs) in the case of summer crops, for both beneficiaries and graduates, amounted to LE 569 for maize, LE 830 tomatoes, LE 930 for peanuts, LE 1222 for seed melons, and LE 355 for squash.
4. Beneficiaries and graduates are eager to follow more economical cropping pattern which includes more of the cash crops as they are not pleased with the current cropping pattern. However, several limiting factors prevent them from achieving their goals, among which were: timing and availability of water resources, unsuitable drainage system, lack of finance, technical and economic risks, inefficiency of the marketing system, difficulties in the procurement of farm inputs (high prices and lack of credit), problems with agriculture workers especially for graduates (shortages, high wages, and low productivity), insufficiency and inefficiency of farm machinery services, and inefficient extension services.

? **El-Saadi, Ahmed M., "Economic Study of the Efficient Use of Agricultural Resources in the Production of Field Crops in Kafr El-Sheikh Governorate", Ph. D. thesis, Tanta University (kafr El-Sheikh), 1996 (Arabic).**

The main objective of the study was the evaluation of the economic efficiency of the use of agricultural resources in the production of field crops. Two districts have been selected for study, the first is Kafr El-Sheikh whose agricultural land is considered as old land while the second district is El-Hamoul whose land is considered as new lands. The study was based on a random sample of 220 farms, out of which 107 from three villages in the first district and 113 from three villages in the second district. The main findings were:

1. Even though the farm size was greater in the new lands than in the old lands but yield per feddan was higher in the old land than in the new lands.
2. Main crops produced in the two districts are wheat, maize, rice, cotton, broad beans, sugar beets, and seed melons.
3. Variable production costs per feddan were very similar in both the new and old lands while fixed costs were higher in the old lands.
4. Maize production realized losses in all villages under study while wheat production realized losses in one village in each district.
5. Rice realized the highest profitability while sugar beets realized the highest profitability in the new lands.
6. The value of marginal product for land was higher than the opportunity cost (market rent) for all crops in all villages under study except wheat and cotton in one of the villages in the new lands.
7. For family labor input, marginal productivity was higher than the market wage in wheat production in one village in the old land and one village in the new land. In general,

family labor productivity was higher in the production of cotton, followed by rice and maize. Similar results were obtained for hired labor.

8. For farm machinery, productivity was higher than the market rate for all commodities in all villages under study.
9. For farm animal power input, nitrogen and phosphorus fertilizers, productivity varied from one crop to another and from one village to another.

? **El-Shater, Ahmed M. and Others, " Analytical Study for Producing Major Crops in the new Lands ", Egyptian Journal of Agricultural economics, Vol. 9, No., 1, March 1999, pp. 349 - 363 (Arabic).**

The main objective of the study was the estimation of the production function for major crops produced in the new lands. A sample of 100 farmers were selected randomly from five different regions in the new lands according to area cultivated in each, 46 producers from Nubaria, 12 from Amriya, and 27 from Ismailia, 8 from Sharkia, and 7 from Qena. The crops selected are wheat, peanuts, potatoes, tomatoes, Bananas, and grapes. The study applied the Rapid Rural Appraisal method for data collection through group meetings of farmers and specialists instead of the individual interviews. Four forms for the production function were tested, the multiple linear, stepwise linear, multiple logarithm, and stepwise log. The main findings were:

1. Positive relationship existed between labor input and the production of potatoes, tomatoes, bananas, and grapes.
2. Positive relationship existed between farm machinery (tractors) and the production of wheat and bananas
3. Positive relationship existed between seeds/seedlings and the production of potatoes and tomatoes.
4. Manure increases the production of peanuts, tomatoes, and bananas.
5. Phosphorus fertilizers increase the production of wheat and bananas but decrease the production of peanuts, potatoes, and grapes.
6. Nitrogen fertilizers reduce the production of all crops under study.

? **Fahmy, Nagwa A., "Activity Analysis for the Agricultural Exploitation of Land Reclaimed in Hamoul sector, Kafr El-Sheikh Governorate", M. Sc. Thesis, Tanta University (Kafr El-Sheikh), 1977 (Arabic).**

The study aimed at investigating the main reasons behind the low productivity of the newly reclaimed lands. The study reviewed the evolution of land reclamation during the period 1952 - 1971 by governorate, including the different authorities that took the responsibility of land reclamation during that period. Linear programming was applied to identify the optimum cropping pattern for the area under consideration. Based on certain constraints related to land, water, and capital resources in addition to minimum areas to be cultivated with wheat and sunflower, an optimum cropping pattern was estimated including wheat, flax and sunflower, providing higher income than the current pattern.

? **Hafez, Suhair M., "Comparative Economic Study for the Traditional and Protected Agriculture in the Reclaimed Lands", M. Sc. Thesis, Ain Shams University, 1997 (Arabic).**

The main objective of the study was to investigate the economics of producing different crops under different systems including green houses, plastic tunnels, as compared with the traditional open cultivation in the new lands. The study was based on secondary data in addition to primary data from a sample of producers from Bustan area of Nubaria during the 1994/95 agriculture season. The sample included 60 farmers, out of which 25 were graduates, 20 investors, and 15 beneficiary. The main findings were:

1. The maximum efficient use of the agricultural resources was realized under green houses, with cucumber and green pepper realizing the highest net returns.
2. Open agriculture realized the lowest returns for cucumber, green pepper and tomatoes than that of the protected farming in tunnels or green houses.
3. Even with the high investment incurred in the green houses (LE 14 thousand per a green house), the returns per pound invested reached four times that of the open cultivation. This indicates that the most efficient use of the reclaimed land is high crop production under protected cultivation.

? **Korraa, Mohammed M., "An Analytical Study for the Production of Major Field Crops in the New Lands", Paper presented to the sixth annual conference of the Egyptian Association of Agricultural Economics, July 1999, (Arabic).**

The main objective of the study was to identify the main factors affecting the production of agricultural commodities in the new lands. This study was based on primary data obtained through the project "The Impact of the Economic Reform Policies on the Cropping Patterns in the New Lands", which was carried on by the staff of the High Institute of Agriculture. The study was based on data from five different new land regions mainly Nubaria, amriya, Salhia, Ismaelia, and Qena, as the new lands in these regions represent 60.5 %, 8.4 %, 5.6 %, 5.3 % and 4.6 %, (Adding up to 84.4 %) of the total new lands in Egypt. The crops selected for study were wheat, peanuts, winter potatoes, summer tomatoes in addition to bananas and grapes. This study was based on 100 farms out of the 346 farms selected for the project study. Data was collected using the Rapid Rural Appraisal method. Linear and double-log production functions were estimated using full and stepwise regressions. The following are the main results of the study:

1. Positive relationship existed between labor input and production of potatoes, tomatoes, bananas, and grapes.
2. Positive relationship existed between machinery input (tractor input) and the production of wheat and peanuts
3. Positive relationship existed between seeds/seedlings and the production of potatoes and tomatoes, while negative relationship existed in the case of wheat.
4. Increased potassium fertilizers increases bananas yield. Increased organic fertilizers use increased the production of peanuts, tomatoes and bananas. Increased phosphorus fertilizer applications increased the production of wheat and bananas, while reducing the production of peanuts, potatoes, and grapes.

Increased nitrogen fertilizer applications increased the yield of all crops under study.

? **Mahmoud, Mahmoud A. and El-Ashmawi, khairi H.," <u>Statistical Cost Estimation of Producing Major Field Crops by Investors in the New Lands (Noubaria Region)</u>", Egyptian Journal of Agricultural Economics, Vol.9, No. 2, September 1999, (Arabic).**

The main objective of the study was to investigate the impact of the new land reclamation and cultivation policies on the economics of agricultural production by investors. The study was based on a sample of 75 fruit producing farmers in Noubaria region, out of which 25 investors located in each of the three sub-regions, Bangar El-Sokker, Bustan, and West Noubaria. Multiple regression was used to estimate the parameters of the quadratic cost functions which gave better statistical and economic results. The main findings of the study are:

1. The costs of banana production were higher than those of producing grapes by 126.1 %, apples by 229.4 %, and mandarin by 269.8 %. Consequently, profit per feddan of banana was about 75.9 %, 80.7 %, and 95.9 % of those for grapes, apples and mandarin respectively.
2. Production of grapes and mandarin proved to be more efficient than the production of bananas and apples on these farms.
3. Maximum yield amounted to about 210 tons of bananas, 12 tons of each of the mandarin and grapes, and 8 tons of apples.
4. The majority of mandarin producers realized the volume of production that minimized average cost with less farmers achieving that volume in bananas (63%), apples (41 %), and grapes (38 %).
5. Some producers interplant fruits with vegetable crops and field crops, which would reduce soil fertility and increase the possibility of increase infections with pests.

? **Mina, Girgis M., "<u>Evaluation of Reclaimed Land Productivity in Fayoum Governorate</u>", M. Sc. Thesis, Cairo University (Fayoum), 1997 (Arabic).**

The main objective of the study was to evaluate the economics of cultivating new lands in Fayoum governorate by the types of producers. The study was based on primary data of 200 producers in the new lands in fayoum governorate during the 1995/96 season, including 86 graduates, 58beneficiries, 27 coop investors, and 47 individual investors, providing the following results;

1. For Graduates: Crops cultivated include wheat, maize, sorghum, barley, winter tomatoes, and sunflower, with an average net returns per feddan amounting to LE 417 per year.
2. For Beneficiaries: Crops cultivated are the same like those of the graduates, with net returns per feddan amounting to LE 868 per year.
3. For Cooperatives: Net returns amounted to LE 226 per year.
4. For investors: Net returns amounted to LE 257 per feddan of field crops and LE 395 for olives.

5. Highest returns in the new lands in Fayoum governorate has been realized by beneficiaries, followed by small investors, graduates and finally cooperatives.

? **Ministry of Agriculture and Land Reclamation and the U.S. Agency for International Development," New Lands Development Study", Volume I, Main Report, April 1994, (English).**

The report, which is the main report, lies in 346 pages including an executive summery followed by a more extensive presentation in a conclusions and recommendations, and covering the following topics:

1. Conclusions and Recommendations.
2. Introduction.
3. Land Reclamation programs and Policies.
4. Benefits/Costs.
5. Production Systems.
6. Marketing.
7. Complementary Production Activities (Desert Plants, Aquaculture).
8. Research and Extension.
9. Credit and Finance.
10. Planning.

Volume II is annex to the main report and contains supplemental analyses, tables and graphs. In addition, there another three volumes that have been produced covering Marketing, Aquaculture, and Desert Plants.

The main objective of this report was to analyze the economics of past, present and prospective land reclamation policies and programs.

The following are the main points presented in the executive summery of the report:

1. The primary data and analysis indicate that much higher levels of productivity and returns were achieved by large investors compared with the various small farm models (graduates, small holders, small investors) despite the larger amount of public sector support provided for small farmers. However, it was found that some small farmers to obtain quite high yields.
2. The study found clear evidence of the economic advantages to the privatization of the state operated lands and other policy shifts from state to private sector land reclamation. These directions have improved overall results in terms of land use, yields, rates of return and generally reduced public sector costs.
3. The policies of the 1970's and early 1980's gave a significant advantage to new lands development. However, recent changes in price and other policies, particularly the reduction / elimination of government fertilizer and energy subsidies place farmers in new lands at a disadvantage. The heavy concentration on fruits and vegetables has increased supplies greatly, in some cases saturating markets; prices have declined. Many small farmers, now produce mainly field crops on which their returns are very

low. The farm surveys covering small-holders, graduates, small and large investors, revealed major inter-group differences in productivity and net returns. Where livestock were kept, net farm income was increased significantly. However, only about 50 percent of the small-holder farms had livestock. Lack of finance was the major obstacle to keeping livestock. Where opportunity existed, outside employment was used to supplement family income. Livestock was a way to available family labor and utilize farm byproducts and wastes. Many graduates and family members had regular jobs outside the community which helped support the farm but also discouraged family settlement in the area. Job opportunities suitable for graduates in new communities are very limited.

4. Field crop yields on small farms were about 60 percent of yields on old lands. However, yields of some crops were higher than in old lands. Costs were somewhat higher, mainly due to higher costs of irrigation systems and higher energy and fertilizer requirements. Difficulties with irrigation water and electric power supplies, as well as with drip and sprinkler irrigation systems, contributed to high risks and costs and limited cropping flexibility. This has led small holders to shift to flood systems even on sandy soils. Lack of site specific technology and institutional finance were additional constraints. The combination of these and marketing constraints plus small farmer efforts to reduce per feddan costs and risks were major factors in their heavy reliance on field crops and consequent low returns.
5. The cost structure for developing and operating projects at the selected sites varies considerably, depending on physical conditions including source of water supply, (canal or well), distance and lift, and the type of farmer. In projects designed for graduates and small holder, the government usually has undertaken almost all of the on-farm development finance, in addition to financing the cost of canals, pumps, and other infrastructure. Such farmers are charged only a small fraction of the cost of the initial development. Most investors are now responsible for carrying out the on-farm development, and the government charges them for a higher proportion of the investments in the infrastructure, (usually 50 % of the off-farm irrigation system costs).
6. Because of the high costs incurred by the government for most types of new lands projects, the net social benefits of these projects are considerably less than the net incomes the farmers achieve. Taking the government's net investment plus its maintenance and repair costs into account, the net benefits per feddan were found to range from a net social loss of LE 844 per feddan for small investors in Bustan to a net gain of LE 608 per feddan for small farmers in Manaif.
7. The rates of return (IRR) were first calculated on the farmer's investment. Overall economic rates of return (ERR) were then calculated, incorporating both the farmer's and the government's costs and benefits. The results of the two types of analysis are as follows:

Rate of Return	Small Farmer (Bustan)	Small Investor (Bustan)	Large Investor (Khatatba)	Small Farmer (Manaif)
IRR	16.5 %	1.9 %	13.8 %	55.7 %
ERR	- 6.3 %	0.7 %	13.8 %	12.4 %

8. It is possible to improve the performance of existing new lands projects by providing improved government services and support. The returns to such efforts would be more attractive, considering that the investments in the infrastructures have already been made for existing projects. This would in effect complete development models by adding post infrastructures development support to infrastructure construction and water delivering already completed or in progress.
10. Water and land limitations are ultimate constraints on amount of new lands that can be developed. Neither land nor water should be an absolute constraint in implementing targets through 2000 which will bring total irrigated area to 8.5-9.0 million feddans. Planned water savings and water utilization improvements will be needed; careful monitoring and improved attention to delivery and on-farm water management also will be needed in the future. Some notable improvements in irrigation are being made (drip and sprinklers, protected crops, shorter season wheat, rice and cotton, and furrow and drip systems for sugarcane.
11. An immediate program is proposed directed to improvement in productivity in already reclaimed areas with experience from such efforts, as tested and proven, to become an integral part of future new land reclamation programs directed to smaller farmers and small investors. Major components of small farmer production intensification should include measures to improve marketing, irrigation efficiency, and other production technology. The latter should include financing of tunnels and greenhouses and livestock enterprises as well as other crop production directed mainly to small farmers.
12. The study has begun the process of assembly and analysis of basic data for planning using survey techniques, and assembly of information from a variety of past public and private data and collection efforts. The process should be continued using survey and Rapid Rural Reconnaissance (RRR). Additional surveys should be carried out to expand primary data, to continue to analyze problems, to monitor results of developments, and provide production and marketing information,etc.

The first chapter of the report, Conclusions and Recommendations, discussed the following issues:

? **Policies and Program Directions:**

From 1952 to 1961, land tenure reforms were major undertakings; a small amount of private reclamation was continued from prior to 1952 stimulated by tenure reform. In the second decade, land reclamation shifted from private to public sector, consistent with the prevailing socialist philosophy. A large amount of land was reported reclaimed, but public land companies assigned to operate this land was overstaffed, inefficient, ineffective, measured by reported yields and production accomplishments. In the seventies, land reclamation policy shifted to greater private sector participation. Some farm lands were distributed to private sector. The greater freedom accorded farmers in the new lands plus the input subsidies stimulated private investment in land reclamation, which continued in the eighties and early nineties.

The economic policy changes which began in 1986/87 and continued with the structural adjustment program from 1991 until now have operated at the disadvantage of many new lands farmers and new land development. This was due to the removal of subsidies for inputs, particularly energy, fertilizers, and related credit, which

increased costs substantially for new lands with higher input requirements. Domestic markets approached saturation of fruits and vegetables that have been promoted as high value crops. Small farmers now put a large percentage of their land in cereals and other field crops, despite generally low returns. The self-sufficiency of wheat increased from 25 to 50 percent. The current survey shows that productivity and net income of most farms in new lands are still well below levels in old lands. The large enterprises as a group have been particularly successful in improving production, gross income and net returns, and in dealing with constraints that still impede small farmers in improving yields.

Livestock play an important role in new lands, especially among small holder families. Most livestock enterprises are small with one to two cows, one to ten sheep and goats, and a few chickens. The farmer's IRR increased from 14 to 24 percent when a typical livestock enterprise was added under current conditions. Almost half of the small holders have livestock but very few graduates had livestock. Very large farms tend to specialize. A few have very large livestock herds but most have few or no livestock.

? **Farming Systems:**

The capacity of the farmer to manage alternative crops with different soils and irrigation systems is a critical factor affecting yields. This and his ability to market fruits and vegetables and specialty crops often determine his rotation and crop choices and overall profitability. For farms raising mainly traditional field crops, livestock become more important in obtaining even minimally acceptable returns. A high percentage of fruits and vegetables improves returns if the market constraint is relieved by market access. Protected production in greenhouses or tunnels is common among very large farms which also have good marketing program.

? **Land and Water:**

A large proportion of the soils reclaimed from 1952 to 1980 were clay textured soils. Of the 3.4 million feddans identified by the Land Master Plan for development, nearly 80 percent of the soils are coarse sands and sand looms. Over 50 percent are coarse to gravely sands. Medium to fine textured soils, usually the best for irrigation, are confined to the coastal strip along the Mediterranean and to the West Desert Oases. The reclamation and development of new lands has been a major and costly aspect of agricultural policy in Egypt since the sixties until now. The relatively new technology including pressure irrigation systems, fertigation, and chemigation practices, plastic mulch, plasticulture and the introduction of new varieties have permitted rapid changes in the new lands. The major constraints facing the rapid development of these soils are related to the low water holding capacity and the inherent low fertility status. For new lands, very little research and farm testing has been done in Egypt, on the sandy soils; inadequate information is available on the most appropriate crops to be grown, fertilizers to apply, amounts of water to use, rotations to employ, and other management key factors.

? **Agricultural Production Potential:**

The agricultural production potential of the clay soils in the new lands appears to be equal to that of the clay soils in the Delta. However, shortages of water in the canals at

critical growth periods are likely to continue to be important technical limitation on crop yields even on the clayey lands. Buildup of salt and water tables will be a constant threat. Sandy lands, in contrast to the clayey areas, present a formidable challenge to many farmers, especially those who have no experience in managing sandy soils and sprinkler and drip irrigation systems. This is apart from the usual problems of inadequate and unreliable water supplies, lack of financial services, and the absence of reliable advice on managing crops, livestock, land and water.

? **Irrigation Water:**

The availability of water to Egypt from the High Dam is 55.5 billion cubic meters (BCM) annually under the 1959 Nile agreement with Sudan. Ground water pumping adds about 3.1 BCM each year. Irrigation water demand in 1990 was approximately 49.7 BCM; about 87 percent of the water used for agriculture, municipalities, and industry. Drainage water at the coast amounted to around 12 BCM in 1990. At the High Dam the Nile River salinity is 250 parts per million (ppm), increases at Cairo to 350 ppm. Drainage water at the lower end of the irrigation system at the coast may be as high as 2300 – 2700 ppm . Ground water in Nile aquifers is less than 500 ppm, whereas the salinity of new valley wells is about 500 ppm.

Excessive use of irrigation water is widespread though water is scarce and for the government a costly resource; for most farmers the water is virtually free. Most salinity and drainage problems would be less severe and less expensive to remedy if water was used more efficiently.

? **Cropping Systems:**

A comparison of crop yields between the old lands and the new lands shows that some fruit yields were as high in the new lands as in the old lands. Most vegetable crop yields were lower on small farms in the new lands, but higher yields were reported for some crops as tomatoes and potatoes. Most field crop yields were lower in the new lands, with considerable variation among crops. Oil seed crops and soybean yields were higher in the new lands. Most fruit and vegetable crops can do as well or better on the new lands compared with old lands, when managed properly.

Given the higher cost of irrigation water in most of the new lands, farmers have a greater incentive to improve efficiency, but because of lack of information on crop/water relationships and the difficulties that small farmers have with modern irrigation systems, many have reverted to flood system even in sandy soils. The lack of consistent data on crop water requirements under various conditions is an obstacle both to improved planning and scheduling and to on-farm operations.

Land use intensity is often high in both new and old lands, reaching 1.7 for small farmers in new lands and about 2.0 in old lands. Climatic conditions in Egypt permit a cropping intensity of non-permanent crops of two or more in new lands. For a given crop, production costs are similar in new and old lands. Major differences are in costs of irrigation, energy and fertilizers which are higher in new lands. Cost of harvesting is directly correlated with yields. Pest control is higher in old lands.

? **Economic Evaluation of New Lands Projects:**

New lands production has changed in many ways over the past 15 years. Not only have sprinkler and drip irrigation gained in use, but more efficient systems have been introduced; adoption of other new technologies such as plastic tunnels for winter vegetable production has begun to spread. New, higher yielding crops such as fruits and hybrid tomatoes and melons have been introduced. Private investors can now develop wells and establish farms in areas not served by canals.

It was estimated that the incremental cost associated with new land development averages about LE 6500 per feddan, with 80 percent of the irrigation system would be sprinkler whereas 20 percent would be drip. Farm revenues were found to vary from an average of LE 1243 per feddan for graduate farms in Bustan to a high of LE 3686 per feddan for small holders at Manaif in Ismailia due to high proportion of vegetables and fruits in the cropping pattern. Net farm incomes ranged from a loss of LE 352 per feddan for small investors in Bustan to a high of LE 1533 per feddan for small holders at Manaif.

? **Constraints to Increased Production:**

The main constraints of agricultural production in the new lands can be arrayed according to priorities as follows:

1. Irrigation System:

   Farmers face a wide variety of problems with irrigation, most of which are associated with the planning, design and management of irrigation water delivery systems including on/off scheduling, un-scheduling interruptions, scheduled cleaning cut-offs, and low water. Other irrigation problems include difficulty with

maintenance and operation of the farm drip or sprinkler systems. Small holders planted more field crops, and often used flood irrigation because of irrigation problems, leading to lower crop intensity.

2. Marketing:

Marketing system deficiencies were a problem mainly for fruits, vegetables and some special crops, e.g. peanuts. Weakness in market structure in new lands is a general problem. Lower prices for many field crops reflect the absence of government buying activities in the area and the purchase by dealers who may sell to public sector buyers. Prices for fruits and vegetables obtained by large farms ranged from the same as those obtained by small farmers when both were selling to through the kelala channel, to a little more when selling to dealers, to about 50 percent more in wholesale markets compared with small farmers selling in their local regular markets, and up to 10 times higher when sold for export.

3. Finance:

Lack of financial resources was frequently cited by farmers as a major constraint. For the largest farms, it was the most important single constraint. The lack of institutional finance led many small farmers to borrow from wholesalers and other marketing entities with no interest but under potentially harsh marketing conditions.

4. Production Technology:

For some farmers, the most serious constraint was production technology in its various manifestations: site specific crop and livestock research, extension, and on-farm water management. Many small farmers used the same technologies utilized in the old lands and usually produced low returns on low-risk traditional crops using family labor. Technology was a particularly serious problem for 70 percent of the graduates who had no formal training or prior experience in farming. However, graduates were better able to cope with or at least to accept modern irrigation systems.

5. Other Constraints:

Off-farm employment is important to graduates who generally have higher costs than small holders because they hire more labor. Off-farm employment is important to small holders; it makes up a major part of small farm income in new lands and nationally. Small holders differ from graduates in having family labor to meet their farm needs and being willing to accept local farm labor jobs.

Education and social facilities are important. In the absence of employment opportunities, educational facilities, and certain amenities, some families will not move to, and thus not develop new lands.

? **Marketing:**

Major conclusions of the marketing section are:

1. Marketing costs in Egypt are high given the low wage levels, short distances between farms and consumers and the low quality of products delivered to consumers. Much of this high cost is associated with the complexity of the systems which involves millions of small transactions and, with product deterioration and loss and inability of the market to trace and reflect quality deterioration.

2. There is considerable oligopolistic collusion and apparent excess market power at local fruit and vegetable wholesale levels. Ten or fewer wholesalers control a high percentage of products entering the major urban wholesale markets. Often their agents have made advance purchases for products with purchase prices based on sales prices which farmers have little capacity to verify.
3. Physical losses for perishable products including quality loss are as high as 30 percent. The farmer must pay the cost of handling, transportation, and disposing of the un-salable product.
4. Farmers are heavily dependant on wholesale merchants for crop financing with accompanying detrimental contracting arrangements such as use of the blank I.O.U.
5. Egypt has a great untapped export market potential for several high quality products including: Early seedless grapes, Strawberries, Peaches, Cantaloupe, Citrus, Green beans, Potatoes, Onions, Garlic, and Tomatoes. However, the major barriers to increasing exports are:
    - One. Egyptian products have an extremely poor quality reputation, mostly carry over from the days of poor quality and service provided by the state trading companies.
    - Two. Egyptian exporters are not trusted as steady and reliable suppliers over an acceptable marketing season, with the exception of potatoes and citrus exporters.
    - Three. There is a lack of knowledge of exporters and effective grower contracts and supervision.
    - Four. Post harvest technology and management know how are lacking.
    - Five. Exporters suffer from international transportation difficulties because of airline restrictions on shipments leaving Egypt.
    - Six. Ineffectiveness of the market in reflecting quality/price relationships through various levels; identifying quality and mishandling at each level; and penalties for mishandling or deceit.

? **Mostafa, Ahmed M. and Others," Economic Efficiency of Producing Different Field Crops According to Modern Irrigation Systems in the New Lands ", Egyptian Journal of Agricultural Economics, Vol. 8, No.2, September 1998, pp. 521 - 534 (Arabic).**

The main objective of the study were to make economic evaluation for the modern irrigation systems in the new lands based on a random sample of 100 producers using Nile water and 20 producers using underground water in the regions of Sadat City, Wadi Natroun, and Intlak. The economic evaluation was based on: a) the ratio of net returns per feddan to total production costs and b) the ratio of the net returns per feddan to the irrigation costs (the net returns per pound spent on irrigation). The main findings of the study were:

1. Nile Water: For fruit seedlings, the fixed sprinkler irrigation ranks first followed by the pivot sprinklers. For fruit trees, Drip irrigation ranked first. For field crops, the semi-portable and the fixed sprinklers are more suitable.
2. Underground Water: Pivot sprinklers ranked first, followed by drip irrigation and portable sprinklers.

According to the crops produced, the study indicated that:

a) Fixed Sprinklers: Peanuts ranked first, followed by seed melons, peas, and wheat.
Two) Semi-portable Sprinklers: seed melons ranked first, followed by peas, clover, peanuts, lupins, maize, wheat, and sesame.
Three) Pivot Sprinklers: Summer Potatoes ranked first, followed by wheat, barley, maize, and sun-flower.
d) Drip irrigation: Olives, followed by jwava, grapes, mango, apples, and banana.

? **Nasr, Mamdouh M.; Moursy, Bahaa E., and El-Bassiouny, El-said A., "The Economic Efficiency of the Use of Factors of Production in the New Lands for the Production of Pepper using Protected Agriculture", Egyptian Journal of Agriculture Economics, Vol. 9, N.2, September 1999, (Arabic).**

The study aimed at investigating the economics of producing Vegetable crops, especially pepper in the new desert lands using the protected agriculture in order to increase the exports of such nontraditional commodities by estimating:

1. The production function of green pepper under protected agriculture.
2. The cost function.
3. The optimum size of production and the optimum combination of resources that maximizes the efficiency of factors used.

The data used for the study was based on a sample of 60 farmers from West Noubaria region, representing graduates, investors, and beneficiaries distributed among seven villages. Different forms of production functions were applies, mainly the linear, quadratic, and the log functions. The main findings of the study were:

1. The optimum output amounted to 10.14 kilogram per square meter with 0.08 unit of nitrogen, 0.12 unit of potassium, 0.02 unit of phosphorus, and 0.15 cubic meter of organic fertilizers per cubic meter of cultivated pepper.
2. Elasticities of production indicated that the main factors determining the production of pepper under protected agriculture are labor followed by nitrogen fertilizers and organic fertilizers.
3. Net revenue per feddan, cost of production per ton, and fixed capital varies between greenhouses and tunnels. Net revenue in the greenhouses was 400 percent higher than that of the tunnels.

? **Seif, Madiha M., "Economic Study for the Use of Agriculture Resources in the Reclamation region West of Samalout in Minya Governorate", Ph. D. thesis, Minia University, 1997 (Arabic).**

The main objective of the study was investigation of the efficient use of the agricultural resources in the reclaimed area west of Samalout, Minia Governorate. This area includes 8 villages, out of which one village has been selected randomly, covering 2085 feddans cultivated mainly with wheat, tomatoes, peanuts, sesame, and maize in addition to citrus, olives and date palms. Log production functions were estimated to determine the efficiency of the resources used. The main findings of the study were:

1. The area suffers tremendously (90 % of the farmers) from lack of farm inputs, mainly chemical fertilizers and labor as the nearest populated location is about 10 kilometers far in addition to unavailability of social services, hospitals, communication facilities and frequent power failure.
2. About 52 % of the producers are college graduates, mainly from Minya governorate and depend mainly on hired labor and credit.
3. Traditional crops like wheat and maize are not highly profitable in this new lands and are cultivated mainly for self-sufficiency while cash crops like tomatoes, peanuts and sesame are more profitable in the new lands than in the old lands.

? **Shafey, Mahmoud A., and El-Mahy, Mahmoud M., "<u>Using Parametric Programming for derivation of demand functions of Agricultural Resources in West Nubaria in A.R.E.</u>", King Saud University Journal for Agricultural Sciences, V.7, 1995. (Arabic).**

The study aimed at derivation of the demand functions for agriculture resources for the prevailing cropping pattern and dominant irrigation systems in West of Nubaria for the purpose of determining their prices. The study was based on previous studies concerning the issue and on a random sample of 150 farmers in the region under study, representing 5.2 percent of the population. Parametric Programming Technique to estimate shadow prices (the value of marginal productivity) for the factors of production and to determine the optimum quantity of the resources that should be applied under various levels of prices. Demand functions were estimated for irrigation water, labor, nitrogen fertilizers, and phosphorus fertilizers. The main findings were:

1. The Marginal Value Productivity of the factors of production under study was decreasing as quantity used increased, which coincides with the economic theory that the demand curve of an input is the negatively sloped part of the marginal value productivity curve.
2. With respect to farms using sprinkler irrigation systems, the study estimated the marginal value productivity for the optimum use of water to be LE 5.0 per unit of water (1000 cubic meter), increasing to LE 20.0 per water unit for surface irrigations.
3. For the optimum use of labor input, the value of marginal productivity amounted to LE 3.0 per unit of labor (man/day) under sprinkler irrigation systems, increasing to LE 7.6 per unit of labor in the case of surface irrigations.
4. The value of marginal productivity at the optimum use of nitrogen fertilizers amounted to LE 19.4 per unit of fertilizer (50 kilograms) in the case of sprinkler irrigations, increasing to lE 31.9 per unit of fertilizer for surface irrigation.

5. For phosphorus fertilizers, it amounted to LE 14.2 per unit of fertilizer for sprinkler irrigation, and LE 12.7 per unit of fertilizer under surface irrigation.

? **Shafik, Abdel-Aziz M. and Yehia, Magdy A.,"<u> Some Social factors Affecting the Degree of Social Adaptation for Graduates in Banger El-Sokker Region</u>", Paper presented to the Conference on Economics and Development in Egypt and the Arab Countries, Mansoura University, October 1998, (Arabic).**

The main objective of the study was to identify the degree of social adaptation of the graduates in the new lands and the main obstacles and problems they face. Complete adaptation should pass three stages. The first stage is Accommodation, followed by Adjustment, and finally Assimilation. The study was based on primary data collected from 135 farmers from Banger El-Sokker region, representing 16.3 % of the total number of graduates in the region.

The statistical analysis indicated low degree of social adaptation of graduates. The main problems faced by the graduates in the new lands are mainly : Lack of Financial institutions; Lack of Technical Agriculture expertise and especially marketing know how; and lack of services especially health services.

? **Sultan, Mohamed Y. and El-Ballasi Asmaa O., "<u>Economic Evaluation of the Performance of Graduates and Beneficiaries in the New Lands</u>", Paper presented to the Conference on Economics and Development in Egypt and the Arab Countries, Mansoura University, October 27, 1998, (Arabic).**

The main objective of the study was to evaluate the performance of the graduates and beneficiaries in the new lands by measuring the production efficiency for the different agricultural commodities in the new lands. The study was based on secondary data in addition to primary data collected from farmers in four new regions: South Tahrir, West Noubaria, Bustan, and Banger El-Sokker to represent different soil types and different cropping patterns. A sample of 150 producers were interviewed, out of which 85 were graduates and 65 were beneficiaries, according to their representation in the population. The Benefit/Cost ratio was estimated as a measure of production efficiency in addition to the estimation of the production functions for the different crops. The main findings of the study were:

1. In South Tahrir, there was significant difference between graduates and beneficiaries in the production of apples, wheat, maize, and peanuts. Yield in the beneficiaries fields were 90 %, 44 %, 19 % and 32 % of that in the graduates' fields for the different crops respectively. Similarly, there was significant difference in revenues. This might be due to the experience of the beneficiaries in agriculture activities in addition to their continued presence on the farms. Wheat production function indicted excess use of labor, farm machinery, animal power and insecticide inputs.
2. In West Noubaria, significant difference in revenue existed between graduates and beneficiaries in the case of potatoes and peanuts. Revenue for beneficiaries exceeded that of graduates by 59 % and 64 % for the two crops respectively.

There were no significant results between beneficiaries and graduates in the production of wheat, alfaalfa, squash and grapes. Wheat production function indicated excess use of labor input while that of alfaalfa indicated excess use of farm machinery input.

3. In Bustan, significant difference existed in peanuts, with an increase amounting to 42 % for the beneficiaries. Production functions indicated excess use of labor input in the production of broad beans and sesame.
4. In Bangar El-Sokker, there were no significant differences between beneficiaries and graduates in the production of wheat, broad beans, seed melon, and maize. Production functions indicated excess use of labor input in the production of maize and seedmelon.

IV MARKETING AND PRICING

? **Ministry of Agriculture and Land Reclamation; U.S.AID, "New Lands Development Study - Analysis of Egyptian Food Marketing System With Special Reference to The New Lands", Volume II, April 1994, (English).**

The report lies in 67 pages in addition to a big annex. The report covered the following issues:

1. Overview of the food marketing system
2. Fruit and Vegetable marketing in Egypt.
    - ? Farmers.
    - ? Wholesalers.
    - ? Retailers.
    - ? Production quantities.
    - ? Prices.
    - ? Exports.

3. Milk marketing channels.
4. Fish marketing channels.
5. Food processing.
6. Marketing problems.
    - ? Economies of Scale.
    - ? Lack of production specialization and product concentration.
    - ? Poor production financing.
    - ? Lack of market knowledge.
    - ? Detrimental wholesale market practices.
    - ? Physical losses.
    - ? Ineffective vertical market coordination.
    - ? High market costs.

7. Recommendations.
    - ? National recommendations.
    - ? Specific new lands recommendations.

Egypt, like many other countries, failed to recognize that separation of production from decisions from marketing decisions causes serious and economically costly distortions. Even in free market situations, like the Egyptian fruit and vegetable subsector, farmers and the governments have not paid adequate attention to marketing issues. The rapid expansion in the Egyptian production of fruits and vegetables after 1984 is primarily the result of the expansion of planted area in the new lands. As a result of the attractive prices for fruits and vegetables produced in land reclamation areas between 1984 and 1991, land prices there increased dramatically from LE 200 – 1000 to LE 4,000 – 20,000. Farmers insist that all fruit and vegetable prices have deteriorated drastically since 1991. Marketing services provided by wholesalers to farmers are limited to selling and off-loading. They do very little grading, sorting, or special promotion. There is no effort to assist farmers to improve the sales price through post-harvest operations that would improve the quality and reduce losses. However, a few large new lands farms have

developed grading, sorting, packing, and branding on their own. They are able to improve average sales prices by about 30 percent as a result.

Egypt should be able to dramatically increase its exports of several traditional products (potatoes, citrus, onions, garlic, tomatoes, and green beans), as well as a group of non-traditional high value fruits and vegetables (early seedless grapes, peaches, strawberries, and cantaloupe). However, farmers must plant the varieties acceptable to European markets and manage the production process to deliver the high quality demanded by the consumers there.

The demand of the Egyptian consumer for processed foods is limited by the year round availability of fresh products and the low purchasing power and high distribution costs. Some processed products are exported to the Middle Eastern markets. Limited exports are made to Europe due to low and variable quality of the Egyptian processed foods. Since Egypt has excellent prospects for fresh market exports to Europe, economic returns will be greater for efforts devoted to development of fresh produce rather than processed exports.

There is growing recognition that greater attention must be given to the following marketing issues:

1. Economies of Scale:

The entire Egyptian food system (production and marketing) is characterized by small scale enterprises. Since there are no grades ND Standards, transaction costs are particularly high because each batch of product must be personally inspected by buyers before price can be negotiated. These diseconomies create large numbers of poorly paid unemployment opportunities in the marketing, transportation and handling of food products. The Egyptian Government should start now to train leaders in agricultural production and food marketing in the principles of more advanced food marketing arrangements and set the regulatory stage that will facilitate the movement to more efficient food marketing.

2. Lack of Production Specialization and Product Concentration:

Farming is a risky business everywhere. Egyptian farmers must learn how to live with all the normal risks, plus additional risks associated with market distortions, as well as almost total lack of market information. Their response has been to manage those risks by crop diversification. As a result, the farmer is not able to achieve the level of technological and managerial sophistication that can increase yields and profits. In addition, marketing costs and physical losses are higher when marketable quantities are low in a given area. There are important system-wide efficiencies to production specialization and geographic concentration of production.

3. Poor Production Financing:

The average farmer (especially in the new lands) finds production and marketing loans difficult to obtain and costly. Therefore, they get their required finance from wholesalers who have an opportunity through contract arrangements to extract unfair profits at the expense of farmers.

4. Lack of Market Knowledge:

Except for a few large well-educated producers, farmers have very little access to information about the behavior of markets and they are unlikely to have reliable information about the prices in the markets at times when their products are marketed by commission agents or wholesalers. Farmers must have better knowledge about market behavior and better information about past and projected supply demand, and prices.

5. Detrimental Wholesale Market Practices:

Ten or fewer wholesalers control a high percentage of products entering the major urban wholesale markets. Excess profits are quite likely. The more detrimental characteristic of those traditional wholesalers is the refusal to use their strategic position to help farmers, retailers, and product handlers to adopt more efficient marketing practices.

6. Physical Losses:

Physical losses for perishable products are high, reaching 20 percent for fruits and 30 percent for vegetables which reduces farm prices by the same amount. Worse still, the farmer has to pay for the cost of handling, transportation and disposing of the unsalable product. The individual farmer has little incentive to reduce losses because the current marketing system does not reward him for his efforts.

7. Ineffective Vertical Market Coordination:

The problems mentioned above indicate that the marketing institutions are doing a poor job of coordinating the production and marketing process to assure efficient and effective delivery of nutritious and healthy products. Farmers lack the knowledge and information to negotiate effectively with their buyers. Wholesalers, exporters, and processors have not seen the economic advantage of working cooperatively with farmers to plan production to meet expected market demand.

8. High Marketing Costs:

The problems described before combine to produce high marketing costs relative to the quality of the products delivered to consumers. The total marketing margin (percentage markup) of retail prices over prices paid to farmers ranged from 41 to 167 percent for different products. These marketing margins are high relative to the low wage levels, short distances between farmers and consumers and the low quality of the products delivered to consumers.

Egyptian consumers spend a high percentage of their incomes for food (probably ranging from 20-75 percent and averaging over 50 percent). A 10 percent reduction in marketing costs would therefore increase food consumption by 5 percent.

To develop a successful horticulture export industry and to expand domestic sales, farmers middlemen, and exporters must work innovatively as partners – each playing a vital role, each sharing the risks and costs of developing the market and each receiving an acceptable profit to compensate for his economic risks and expenses.

In general, farmers in Nubaria and Ismailia need detailed training and technical assistance in proper production, harvesting, and post harvest handing methods for export market.

Farmers need to be taught the benefits of export production contracting and the principles of negotiating equitable contracts. Small farmers in the new lands have few alternative buyers. They are at the mercy of those who choose to come to them due to lack of nearby village or district markets. The main market services that should be offered for the new lands are:

- ? Dissemination of domestic and international market information and training in the use of such information.
- ? Dissemination of information and training on market behavior, seasonality of production and prices, product profitability, market outlook, negotiating fair sales contracts, appropriate post harvest methods and other market related management information.
- ? Technical advice on how to produce, harvest, and deliver high quality products for the export market.

? **Zayed, Mohamed S. and Others, " Marketing Problems of Agricultural Commodities in the new Lands in Egypt and proposed solutions " , Egyptian Journal of Agricultural Economics, Vol. 8, No. 2, September 1998, pp. 367 - 386(Arabic).**

The study aimed at investigating the main marketing problems facing producers in the new lands. A sample of 248 farmers selected randomly from three locations according to area and number of producers in each, El-Bustan, South Tahrir, and New Valley. The main results of the study, whether for graduates and beneficiaries and small investors were:

- ? Delay in the marketing activities by the coop and the assembly center.
- ? Multiplicity of middlemen with high commissions and fees to the wholesale market.
- ? Unsuitable roads.
- ? Nonexistence of sorting and grading stations.
- ? Unwillingness of exporters to deal with small producers.
- ? Nonexistence of producers union.
- ? High rate of losses and waste during sorting and grading.
- ? Lack of packing materials.

The main proposals for improving marketing in the new lands are:

1. Sorting and Grading: Establishment of governmental sorting and grading stations to use the export standards.
2. Packing: Establish packing units to use export standards and suitable packs.
3. Storage: Establish storage facilities in addition to repairs and maintenance of the available storage units.
4. Transportation: Reduce transport costs; increase the refrigerator trucks; and maintain local roads.
5. Others: Establishment of marketing cooperatives, assembly centers, processing units, and credit associations.

ANNEX B: AREA RECLAIMED BY REGIONS AND GOVERNORATES, 1952-1997

Table B1-1: Area Reclaimed by Region-During the Period 1952 - 1997

Area Number	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
1	East Delta	20400	53900	74010	12000	15720	27720	34820	123770	158590	40350	198430	238780	235480	237920	573400
2	Middle Delta	5700	141000	8600	7800	4975	12775	14685	36000	50685	5000	22500	27500	182785	63475	246260
3	West Delta	42500	320669	39920	96500	……	96500	79677	132748	212425	74842	47028	121870	654108	179776	833884
4	Middle Egypt	6700	76700	….	….	4900	4900	11450	11100	22550	13750	25000	38750	108600	41000	149600
5	West Coast /New Valley	3400	57800	10900	4670	9000	13670	24100	130000	154100	11950	34000	45950	112820	173000	285820
6	Saini	100	11258	7000	9800	1250	11050	14800	220000	234800	34000	45950	112820	173000	285250	331608
7	Other Areas	….	….	….	….	18341	18341	….	….	….	….	….	….	….	18341	18341
Grand Total		**78800**	**735527**	**144280**	**131770**	**58038**	**189808**	**187132**	**663168**	**850300**	**172742**	**399958**	**572700**	**1450251**	**1121164**	**2571415**

Source: Collected and tabulated from the GARPAD data by the study team.

Table B1-2: Area Reclaimed by Regions- East Delta Region-During the Period 1952 - 1997

Parcel Number	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
1	El-Gabal El-Asfar	500	….	….	….	….	….	….	….	….	….	….	….	500	….	500
2	Anshas	….	1500	….	….	….	….	….	….	….	….	….	….	1500	….	1500
3	El-Mullak	….	5000	14000	….	….	….	….	….	….	….	4000	4000	19000	4000	23000
4	El-Manaief&Coops	4400	….	….	….	1000	1000	….	10000	10000	….	14000	14000	4400	25000	29400
5	Suez	300	….	….	….	….	….	….	….	….	….	….	….	300	….	300
6	El-Ferdan	….	5000	….	….	….	….	….	….	….	….	….	….	5000	….	5000
7	Bahr El-Baqar	…	17300	….	….	….	….	….	….	….	….	….	….	17300	….	17300
8	El-Qasabi	10200	20100	….	….	….	….	….	….	….	….	….	….	30300	….	30300
9	Abou El-Akhdar	….	5000	….	….	….	….	….	….	….	….	….	….	5000	….	5000
10	El-Serw	5000	….	….	….	….	….	….	….	….	….	….	….	5000	….	5000
11	El-Salhia	…..	….	23000	9000	….	9000	9000	1600	25000	….	17000	17000	74500	33000	107500
12	El-Shabab	….	….	33500	….	….	….	….	….	…	….	….	….	33500	….	33500
13	Faraskour	….	….	3510	….	….	….	….	….	….	….	….	….	3510	….	3510
14	Husseneia	….	….	….	….	8000	8000	13020	16480	29500	12980	1402	27000	26000	38500	64500
15	South Port Saeed	….	….	….	….	….	….	….	10790	10790	….	25210	25210	….	36000	36000
16	Sahl Port Saeed	….	….	….	….	….	….	6800	….	6800	13500	27700	41200	20300	27700	48000
17	Berket Um El-Reesh	….	….	….	….	….	….	….	11000	11000	8200	….	8200	8200	11000	19200
18	Coop Bilbis Road	….	….	….	….	2720	2720	….	10000	10000	….	5000	5000	….	17720	17720
19	El-Salhia Desert	….	….	….	….	2000	2000	….	4000	4000	….	88000	88000	….	130000	130000
20	El-Khattarah	….	….	….	10000	….	10000	….	….	….	….	….	….	10000	….	10000
21	Ramsis Company	….	….	….	2000	….	2000	1500	….	1500	….	….	….	3500	….	3500
22	El-Matariah/salam	….	….	….	….	2000	2000	….	6000	6000	….	….	….	….	8000	8000
23	El-Adliah															
24	Masraf El-Atwa	….	….	….	….	….	….	….	3500	3500	….	….	….	….	3500	3500
18	Bain El-Matareen	….	….	….	….	….	….	….	….	….	….	3000	3000	….	3000	3000
Sub-Total East Delta		**20400**	**53900**	**74010**	**12000**	**15720**	**27720**	**34820**	**123770**	**158590**	**40350**	**198430**	**238780**	**235480**	**337920**	**573400**

Source: Collected and tabulated from the GARPAD data by the study team.

Table B1-3: Area Reclaimed by Region-Middle Delta Region-During the Period 1952 - 1997

Parcel Number	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
27	El-Satamouni	3200	….	….	….	….	….	….	….	….	….	….	….	3200	….	3200
28	Hafeer Shehab el-Deen	….	55000	1000	2100	….	2100	3100	….	3100	1000	….	1000	62200	….	62200
29	Elhamoul / Nabarouh	59600	….	….	….	….	….	….	….	….	.	…	….	59600	….	59600
30	ElZawiah/ElMansour	….	14000	7000	….	….	….	10085	../..	10085	….	….	….	31085	….	31085
31	Shalma	2500	12400	….	….	….	….	….	….	….	….	….	….	14900	….	14900
32	ElSannania	…	….	600	2500	….	2500	….	….	….	….	….	….	3100	….	13100
33	Elkhashaa / Balteem	….	….	….	3200	….	3200	1500	….	1500	….	….	….	4700	….	4700
34	Abou Madi	….	….	….	….	3275	3275	….	30000	30000	1000	15500	16500	1000	48775	49775
35	ElBorolloss	….	….	….	….	1700	1700	….	6000	6000	….	….	….	….	7700	7700
36	Elkome ElAkhdar	….	….	….	….	….	….	….	…..	….	….	7000	7000	….	7000	7000
37	North Metoubass	….	….	….	….	….	….	….	….	….	….	….	….	3000	….	3000
Sub-Total Middle Delta		**5700**	**141000**	**8900**	**7800**	**4975**	**12775**	**14685**	**39000**	**50985**	**5000**	**22500**	**27500**	**182785**	**63475**	**256260**

Source: Collected and tabulated from the GARPAD data by the study team.

Table B1-4: Area Reclaimed by Region-West Delta Region-During the Period 1952 - 1997

Parcel Number	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
37	ElBouseily	800	600	....	....	....	....	....	....	....	....	6000	6000	7400	....	7400
38	Edko	2700	7700	....	....	....	....	....	....	....	....	....	....	10400	....	10400
39	Abis	17200	11800	....	....	....	....	....	....	....	....	....	....	29000	....	2900
40	Elhagir	....	11000	....	....	....	....	....	....	....	....	....	....	11000	....	11000
41	El-Nahda	....	24500	....	....	....	....	....	....	....	....	...	....	24500	....	24500
42	Janakleese/North Sector	3000	46300	....	....	....	....	....	....	....	....	....	....	49300	....	49300
43	Mechanized Farm	....	17000	....	....	....	....	....	....	....	....	....	....	17000	....	17000
44	West Nubariah	....	41500	38420	52700	....	52700	9552	17748	27300	....	....	....	142172	17748	159920
45	Fermesh	....	5400	....	....	....	....	....	....	....	....	....	....	5400	....	5400
46	El-Tahaddi	....	37600	....	....	....	....	....	3000	3000	....	....	....	37600	3000	40600
47	Al-Intlak	....	10000	....	....	....	....	....	....	....	....	....	....	10000	....	10000
48	El-Fath	....	25400	....	....	....	....	....	....	....	....	....	....	25400	....	25400
48	El-Rowwad	18000	8500	....	....	....	....	....	....	....	....	....	....	26500	....	26500
51	El-Falouga	....	....	1500	3500	....	3500	....	....	....	....	....	....	5000	....	5000
52	Around El-Nasr Canal	....	....	....	....	....	....	16685	....	16685	30597	18118	48715	47282	18118	65400
53	Bangar El-Sokker	....	....	....	7500	....	7500	24760	6810	31570	8930	....	8930	41190	6810	48000
54	El-Bustan 1 & 2	....	....	....	25000	....	25000	27500	....	27500	....	....	....	52500	....	52500
54	Bustan Extension	....	....	....	....	....	....	....	3000	3000	32715	11500	44215	32715	14500	47215
55	El-Takhasosia	....	....	....	7800	....	7800	....	....	....	....	....	....	7800	....	7800
56	Cairo/Alex Desert Rd.	....	....	....	....	....	....	....	41390	41390	....	1410	1410	....	42800	42800
57	El-khatatbah	....	....	....	....	....	....	....	56800	56800	....	....	....	....	56800	56800
59	El-Rowaysat	....	....	....	....	....	....	....	....	....	2600	....	2600	2600	....	2600
60	Wadi El-Faregh	....	....	....	....	....	....	...	4000	4000	....	10000	10000	....	14000	14000
61	North Tahrir	....	....	....	....	....	....	11800	....	11800	....	....	...	11800	....	11800
62	Wadi El-Natroun	800	5369	....	....	....	....	....	....	....	....	....	....	6169	....	6169
63	Maryout & Extensions	....	68000	....	....	....	....	....	....	....	....	....	....	68000	....	68000
Sub-Total West Delta		**42500**	**320669**	**39920**	**96500**	**....**	**96500**	**79677**	**132748**	**212425**	**74842**	**47028**	**121870**	**654108**	**179776**	**833884**

Source: Collected and tabulated from the GARPAD data by the study team.

Table B1-5: Area Reclaimed by Region-Middle Egypt Region-During the Period 1952 - 1997

Parcel Number	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
64	Werdan	2500	1000	....	....	....	....	....	....	....	....	....	....	3500	....	3500
65	El-Mansouriah	200	....	....	....	....	....	....	....	....	....	....	....	200	....	200
66	Kome Ushim	....	3100	....	....	....	....	....	....	....	....	....	....	200	....	200
67	El-Fayoum	....	2400	....	....	....	....	....	....	....	....	....	....	2400	....	2400
68	Koutah	4000	....	....	....	....	....	....	....	....	....	....	....	4000	....	4000
69	Mazourah/Sakoultah	....	27500	....	....	....	....	....	....	....	....	....	....	27500	....	27500
70	El-Kamadeer & Tourfah	....	31000	....	....	....	....	....	....	....	....	....	....	31000	....	31000
71	West Tahta	....	5700	....	....	....	....	....	....	....	....	....	....	5700	....	5700
72	El-Saff & Ghammazah	....	....	....	....	4900	4900	....	11100	11100	....	18000	18000	....	34000	34000
73	West Fashn/Samalout	....	....	....	....	....	....	11450	....	11450	5550	....	5550	17000	....	17000
74	West Bani Suef	....	....	....	....	....	....	....	....	....	3000	....	3000	3000	....	3000
75	East Wahbi Sea	....	....	....	....	....	....	....	....	....	3200	...	3200	3200	....	3200
75	Intra Wahbi Sea	....	....	....	....	....	....	....	....	....	....	1000	1000	....	1000	1000
A	Intra Wassif Sea	....	....	....	....	....	....	....	....	....	....	6000	6000	....	6000	6000
B	Wadi El-Rayan	....	....	....	....	....	....	....	....	....	2000	....	2000	2000	....	2000
76	El-Minya	....	6000	....	....	....	....	....	....	....	....	....	....	6000	....	6000
Sub-Total Middle Egypt		**6700**	**76700**	**....**	**....**	**4900**	**4900**	**11450**	**11100**	**22550**	**13750**	**25000**	**38750**	**102600**	**41000**	**143600**

Source: Collected and tabulated from the GARPAD data by the study team.

Table B1-6: Area Reclaimed by Region-Upper Egypt Region-During the Period 1952 - 1997

Parcel	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
Number					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
78	West Esna	….	17000	….	….	….	….	….	….	….	….	….	….	17000	….	17000
79	Elredisa/Wadi Abadi	….	13200	….	….	….	….	….	….	….	….	….	….	13200	….	13200
80	Kome Umbo	….	44000	2000	….	….	….	….	….	….	….	….	….	46000	….	46000
81	Around Nasser Lake	….	….	1850	1000	…	1000	….	….	….	….	….	….	2850	….	2850
82	Wadi Khrest/Shait	….	….	….	….	1552	1552	….	700	700	….	….	….	….	2252	2252
83	El-Marashdah	….	….	….	….	2300	2300	600	350	950	3750	….	3750	4350	2650	7000
84	East Assyout	….	….	….	….	….	….	3000	….	3000	1000	….	1000	4000	….	4000
85	East Touk Sons	….	….	….	….	….	….	4000	….	4000	5500	….	5500	9500	….	9500
86	West Girga	….	….	….	….	….	….	….	2000	2000	2000	1000	3000	2000	3000	5000
87	Wadi El-Lakitah	….	…	….	….	….	….	….	500	500	….	….	….	….	500	500
88	Wadi El-Saaidah	….	….	…	….	….	….	….	6000	6000	11200	8000	19200	11200	14000	25200
Sub-Total Upper Egypt		**….**	**74200**	**3850**	**1000**	**3852**	**4852**	**7600**	**9550**	**17150**	**23450**	**9000**	**32450**	**110100**	**22402**	**132502**

Source: Collected and tabulated from the GARPAD data by the study team.

Table B1-7: Area Reclaimed by Region-North West Coat, and New Valley Region-During the Period 1952 - 1997

Parcel Number	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
50	North West Coast	400	14980	7000	….	9000	9000	….	130000	130000	….	23000	32000	22380	171000	193380
90	El-Frafrah	….	….	2000	1450	….	1450	24100	….	24100	11700	….	11700	39250	….	39250
92	West Mawhoub	….	….	1900	2400	….	2400	….	….	….	….	….	….	4300	….	4300
93	Baris	….	….	….	320	….	320	….	….	….	….	….	….	320	….	320
94	Sahl El-Zayat	….	….	….	500	….	500	….	….	….	250	….	250	750	….	750
95	Oweinat/Dakhla/Kharga	3000	41266	….	….	….	….	….	….	….	….	….	….	44266	….	44266
96	Baharia Oasis	….	1554	….	….	….	….	….	….	….	….	….	….	1554	….	1554
116	Sahl Frarin	….	….	….	….	….	….	….	….	….	2000	….	2000	….	2000	2000
Sub-Total North Coast/ N.Valley		**3400**	**57800**	**10900**	**4670**	**9000**	**13670**	**24100**	**130000**	**154100**	**11950**	**34000**	**45950**	**112820**	**173000**	**285820**

Source: Collected and tabulated from the GARPAD data by the study team.

Table B1-8: Area Reclaimed by Region-Saini Region-During the Period 1952 - 1997

Parcel Number	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
97	East Bitter Lakes	….	2000	3400	4000	1250	5250	14800	….	14800	3400	2000	5400	27600	3250	30850
98	El-Areesh	….	….	….	800	….	800	….	….	….	….	….	….	800	….	800
98	North East Coast	100	9258	900	….	….	….	….	220000	220000	….	33700	33700	10258	253700	263958
99	Meet Abou El-Kome	….	….	2700	5000	….	5000	….	….	….	….	….	….	7700	….	7700
100	El-Shabab Farms															
101	South Saini	….	….	….	….	….	….	….	….	….	….	28300	28300	….	28300	28300
Sub-Total Saini		**100**	**11258**	**7000**	**9800**	**1250**	**11050**	**14800**	**220000**	**224800**	**3400**	**64000**	**67400**	**46358**	**285250**	**231608**

Source: Collected and tabulated from the GARPAD data by the study team.

Table B2-1: Area Reclaimed by Governorates-for Different Regions-During the Period 1952 - 1997

Area Number	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
1	East Delta	22900	80300	81610	23500	15720	39220	44905	87770	132675	40350	198430	238780	327065	337920	664985
2	Middle Delta	62800	55000	1000	5300	4975	10275	4600	92800	97400	200	22500	24500	133700	120275	253975
3	West Delta	42900	335649	46920	96500	9000	105500	79677	205948	285625	74842	79028	153870	682488	287976	970464
4	Middle Egypt	6700	8054	....	....	4900	4900	11450	11100	22550	13750	25000	38750	37054	41000	80954
5	Upper Egypt	....	144400	3850	1000	3852	4852	7600	9550	17150	23450	9000	32450	180300	22402	202702
6	West Coast /New Valley	3000	41266	3900	4670	....	4670	24100	....	24100	13950	....	13950	88886	2000	90886
7	Saini	100	11258	7000	9800	1250	11050	14800	220000	234800	3400	64000	67400	46358	285250	231608
8	Other Areas	....	....	....	....	18341	18341	....	....	....	....	....	....	....	18341	18341
Grand Total		138400	675927	144280	140770	58038	198808	187132	627168	814300	169942	397958	569700	1495851	1115164	2513915

Source: Collected and tabulated from the GARPAD data by the study team.

* It should be noted that figures in these group of tables are somewhat different than the previous group of tables because of the rearranging of the locations according to the region which belongs to the governorate's capital.

Table B2-2: Area Reclaimed by Governorate-East Delta Region-During the Period 1952 - 1997

Parcel Number	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
Qalubia Governorate:																
1	El-Gabal El-Asfar	500	….	….	….	….	….	….	….	….	….	….	….	500	….	500
2	Anshas	….	1500	….	….	….	….	….	….	….	….	….	….	1500	….	1500
Total Qalubia		**500**	**1500**											**2000**		**2000**
Ismailia Governorate:																
3	El-Mullak	….	5000	14000	….	….	….	….	….	….	….	4000	4000	19000	4000	23000
4	El-Manaief&Coops	4400	….	….	….	1000	1000	….	10000	10000	….	14000	14000	4400	25000	29400
12	El-Shabab	….	….	33500	….	….	….	….	….	…	….	….	….	33500	….	33500
20	El-Khattarah	….	….	….	10000	….	10000	….	….	….	….	….	….	10000	….	10000
Total Ismaelia		**4400**	**5000**	**47500**	**10000**	**1000**	**11000**	**….**	**10000**	**10000**	**….**	**18000**	**18000**	**66900**	**29000**	**95900**
Suez Governorate:																
5	Suez	300	….	….	….	….	….	….	….	….	….	….	….	300	….	300
6	El-Ferdan	….	5000	….	….	….	….	….	….	….	….	….	….	5000	….	5000
25	West of Suez	….	….	….	….	….	….	4500	….	4500	5670	500	6170	10170	500	10670
Total Suez		**300**	**5000**	**….**	**….**	**….**	**….**	**4500**	**….**	**4500**	**5670**	**500**	**6170**	**15470**	**500**	**15970**
Sharkia Governorate:																
7	Bahr El-Baqar	…	17300	….	….	….	….	….	….	….	….	….	….	17300	….	17300
8	El-Qasabi	10200	20100	….	….	….	….	….	….	….	….	….	….	30300	….	30300
9	Abou El-Akhdar	….	5000	….	….	….	….	….	….	….	….	….	….	5000	….	5000
10	El-Serw	5000	….	….	….	….	….	….	….	….	….	….	….	5000	….	5000
11	El-Salhia	…..	….	23000	9000	….	9000	9000	16000	25000	….	17000	17000	74500	33000	107500
14	Husseneia	….	….	….	….	8000	8000	13020	16480	29500	12980	14020	27000	26000	38500	64500
19	El-Salhia Desert	….	….	….	….	2000	2000	….	40000	40000	….	88000	88000	….	130000	130000
21	Ramsis Company	….	….	….	2000	….	2000	1500	….	1500	….	….	….	3500	….	3500
23	El-Adliah															
Total Sharkia		**15200**	**42400**	**23000**	**11000**	**10000**	**21000**	**23520**	**72480**	**96000**	**12980**	**119020**	**132000**	**161600**	**201500**	**363100**

Port Said Governorate:															
15	South Port Saeed	….	….	….	….	….	….	….	10790	10790	….	25210	25210	….	36000	36000
16	Sahl Port Saeed	….	….	….	….	….	….	6800	….	6800	13500	27700	41200	20300	27700	48000
17	Berket Um El-Reesh	….	….	….	….	….	….	….	11000	11000	8200	….	8200	8200	11000	19200
18	Coop Bilbis Road	….	….	….	….	2720	2720	….	10000	10000	….	5000	5000	….	17720	17720
18	Bain El-Matareen	….	….	….	….	….	….	….	….	….	….	3000	3000	….	3000	3000
22	El-Matariah/salam	….	….	….	….	2000	2000	….	6000	6000	….	….	….	….	8000	8000
Total Port Said		**….**	**….**	**….**	**….**	**4720**	**4720**	**6800**	**37790**	**44590**	**21700**	**60910**	**82610**	**28500**	**103420**	**131920**
Damietta Governorate:																
13	Faraskour	….	….	3510	….	….	….	….	….	….	….	….	….	3510	….	3510
32	ElSannania	…	….	600	2500	….	2500	….	….	….	….	….	….	3100	….	3100
Total Damietta		**….**	**….**	**4110**	**2500**	**….**	**2500**	**….**	**….**	**….**	**….**	**….**	**….**	**6610**	**….**	**6610**
Dakahlia Governorate:																
24	Masraf El-Atwa	….	….	….	….	….	….	….	3500	3500	….	….	….	….	3500	3500
30	ElZawiah/ElMansour	….	14000	7000	….	….	….	10085	….	10085	….	….	….	31085	….	31085
31	Shalma	2500	12400	….	….	….	….	….	….	….	….	….	….	14900	….	14900
Total Damietta		**2500**	**26400**	**7000**	**….**	**….**	**….**	**10085**	**3500**	**13585**	**….**	**….**	**….**	**45985**	**3500**	**49485**
Total East Delta		**22900**	**80300**	**81610**	**23500**	**15720**	**39220**	**44905**	**87770**	**132675**	**40350**	**198430**	**238780**	**327065**	**337920**	**664985**

Source: Collected and tabulated from the GARPAD data by the study team.

Table B2-3: Area Reclaimed by Governorate-Middle Delta Region-During the Period 1952 - 1997

Parcel Number	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
Kafr El-Sheikh Governorate:																
27	El-Satamouni	3200	….	….	….	….	….	….	….	….	….	….	….	3200	….	3200
28	Hafeer Shehab el-Deen	….	55000	1000	2100	….	2100	3100	….	3100	1000	….	1000	62200	….	62200
29	Elhamoul / Nabarouh	59600	….	….	….	….	….	….	….	….	.	…	….	59600	….	59600
33	Elkhashaa / Balteem	….	….	….	3200	….	3200	1500	….	1500	….	….	….	4700	….	4700
34	Abou Madi	….	….	….	….	3275	3275	….	30000	30000	1000	15500	16500	1000	48775	49775
35	ElBorolloss	….	….	….	….	1700	1700	….	6000	6000	….	….	….	….	7700	7700
36	Elkome ElAkhdar	….	….	….	….	….	….	….	…..	….	….	7000	7000	….	7000	7000
37	North Metoubass	….	….	….	….	….	….	….	….	….	3000	….	3000	3000	….	3000
Total Kafr El-Sheikh		**62800**	**55000**	**1000**	**5300**	**4975**	**10275**	**4600**	**36000**	**40600**	**5000**	**22500**	**27500**	**133700**	**63475**	**197175**
Menoufia Governorate:																
57	El-khatatbah	….	….	….	….	….	….	….	56800	56800	….	….	….	….	56800	56800
Total Menoufia		**….**	**….**	**….**	**….**	**….**	**….**	**….**	**56800**	**56800**	**….**	**….**	**….**	**….**	**56800**	**56800**
Total Middle Delta		**62800**	**55000**	**1000**	**5300**	**4975**	**10275**	**4600**	**92800**	**97400**	**5000**	**22500**	**27500**	**133700**	**120275**	**253975**

Source: Collected and tabulated from the GARPAD data by the study team.

Table B2-4: Area Reclaimed by Governorate-West Delta Region-During the Period 1952-1997

Parcel Number	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
Beheira Governorate:																
37	ElBouseily	800	600	….	….	….	….	….	….	….	….	6000	6000	7400	….	7400
38	Edko	2700	7700	….	….	….	….	….	….	….	….	….	….	10400	….	10400
60	Wadi El-Faregh	….	….	….	….	….	….	…	4000	4000	….	10000	10000	….	14000	14000
61	North Tahrir	….	….	….	….	….	….	1180	….	1180	….	….	…	1180	….	1180
62	Wadi El-Natroun	800	5369	….	….	….	….	….	….	….	….	….	….	6169	….	6169
Total Beheira		**4300**	**13669**	**….**	**….**	**….**	**….**	**1180**	**4000**	**5180**	**….**	**16000**	**16000**	**25149**	**14000**	**39149**
Alexandria Governorate:																
39	Abis	17200	11800	….	….	….	….	….	….	….	….	….	….	29000	….	29000
40	Elhagir	….	11000	….	….	….	….	….	….	….	….	….	….	11000	….	11000
59	El-Rowaysat	….	….	….	….	….	….	….	….	….	2600	….	2600	2600	….	2600
Total Alexandria		**17200**	**22800**	**….**	**….**	**….**	**….**	**….**	**….**	**….**	**2600**	**….**	**2600**	**42600**	**….**	**42600**
Matrouh Governorate:																
50	North West Coast	400	14980	7000	….	9000	9000	….	130000	130000	….	32000	32000	22380	171000	193380
	Other	….	….	….	….	….	….	….	….	….	….	….	….	….	….	….
Total Matrouh		**400**	**14980**	**7000**	**….**	**9000**	**9000**	**….**	**130000**	**130000**	**….**	**32000**	**32000**	**22380**	**171000**	**193380**

El-Noubaria Region:																
41	El-Nahda	….	24500	….	….	….	….	….	….	….	….	…	….	24500	….	24500
42	Janakleese/North Sector	3000	46300	….	….	….	….	….	….	….	….	….	….	49300	….	49300
43	Mechanized Farm	….	17000	….	….	….	….	….	….	….	….	….	….	17000	….	17000
44	West Nubariah	….	41500	38420	52700	….	52700	9552	17748	27300	….	….	….	142172	17748	159920
45	Ferhash	….	5400	….	….	….	….	….	….	….	….	….	….	5400	….	5400
46	El-Tahaddi	….	37600	….	….	….	….	….	3000	3000	….	….	….	37600	3000	40600
47	Al-Intlak	….	10000	….	….	….	….	….	….	….	….	….	….	10000	….	10000
48	El-Fath	….	25400	….	….	….	….	….	….	….	….	….	….	25400	….	25400
48	El-Rowwad	18000	8500	….	….	….	….	….	….	….	….	….	….	26500	….	26500
51	El-Falouga	….	….	1500	3500	….	3500	….	….	….	….	….	….	5000	….	5000
52	Around El-Nasr Canal	….	….	….	….	….	….	16685	….	16685	30597	18118	48715	47282	18118	65400
53	Bangar El-Sokker	….	….	….	7500	….	7500	24760	6810	31570	8930	….	8930	41190	6810	48000
54	El-Bustan 1 & 2	….	….	….	25000	….	25000	27500	….	27500	….	….	….	52500	….	52500
54	Bustan Extension	….	….	….	….	….	….	….	3000	3000	32715	11500	44215	32715	14500	47215
55	El-Takhasosia	….	….	….	7800	….	7800	….	….	….	….	….	….	7800	….	7800
56	Cairo/Alex Desert Rd.	….	….	….	….	….	….	….	41390	41390	….	1410	1410	….	42800	42800
63	Maryout & Extensions	….	68000	….	….	….	….	….	….	….	….	….	….	68000	….	68000
Total El-Noubaria		**21000**	**284200**	**39920**	**96500**	**….**	**96500**	**78497**	**71948**	**150445**	**72242**	**31028**	**103270**	**592359**	**102976**	**695335**

Source: Collected and tabulated from the GARPAD data by the study team.

Table B2-5: Area Reclaimed by Governorate-Middle Egypt Region-During the Period 1952 - 1997

Parcel Number	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
Giza Governorate:																
64	Werdan	2500	1000	....	....	....	....	....	....	....	....	....	....	3500	....	3500
65	El-Mansouriah	200	....	....	....	....	....	....	....	....	....	....	....	200	....	200
72	El-Saff & Ghammazah	....	....	....	....	4900	4900	....	11100	11100	....	18000	18000	....	34000	34000
96	Baharia Oasis	....	1554	....	....	....	....	....	....	....	....	....	....	1554	....	1554
Total Giza		**2700**	**2554**	**....**	**....**	**4900**	**4900**	**....**	**11100**	**11100**	**....**	**18000**	**18000**	**5254**	**34000**	**39254**
Fayoum Governorate:																
66	Kome Ushim	....	3100	....	....	....	....	....	....	....	....	....	....	3100	....	3100
67	El-Fayoum	....	2400	....	....	....	....	....	....	....	....	....	....	2400	....	2400
68	Koutah	4000	....	....	....	....	....	....	....	....	....	....	....	4000	....	4000
75	East Wahbi Sea	....	....	....	....	....	....	....	....	....	3200	...	3200	3200	....	3200
75	Intra Wahbi Sea	....	....	....	....	....	....	....	....	....	....	1000	1000	....	1000	1000
A	Intra Wassif Sea	....	....	....	....	....	....	....	....	....	....	6000	6000	....	6000	6000
B	Wadi El-Rayan	....	....	....	....	....	....	....	....	....	2000	....	2000	2000	....	2000
Total Fayoum		**4000**	**5500**	**....**	**....**	**....**	**....**	**....**	**....**	**....**	**5200**	**7000**	**12200**	**14700**	**7000**	**21700**
Bani Sweif Governorate:																
73	West Fashn/Samalout	....	....	....	....	....	....	11450	....	11450	5550	....	5550	17000	....	17000
74	West Bani Suef	....	....	....	....	....	....	....	....	....	3000	....	3000	3000	....	3000
Total Bani Sweif		**....**	**....**	**....**	**....**	**....**	**....**	**11450**	**....**	**11450**	**8550**	**....**	**8550**	**20000**	**....**	**20000**
Total Middle Egypt:		**6700**	**8054**	**....**	**....**	**4900**	**4900**	**11450**	**11100**	**22550**	**13750**	**25000**	**38750**	**39954**	**41000**	**80954**

Source: Collected and tabulated from the GARPAD data by the study team.

Table B2-6:Area Reclaimed by Governorate-Upper Egypt Region-During the Period 1952-1997

Parcel Number	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
Minya Governorate:																
69	Mazourah/Sakoultah	....	27500	....	....	....	....	....	....	....	....	....	....	27500	....	27500
70	El-Kamadeer & Tourfah	....	31000	....	....	....	....	....	....	....	....	....	....	31000	....	31000
76	El-Minya	....	6000	....	....	....	....	....	....	....	....	....	....	6000	....	6000
Total Minya		**....**	**64500**	**....**	**....**	**....**	**....**	**....**	**....**	**....**	**....**	**....**	**....**	**64500**	**....**	**64500**
Assyout Governorate:																
84	East Assyout	....	....	....	....	....	....	3000	....	3000	1000	....	1000	4000	....	4000
	Other	....	....	....	....	...	....	....	....	....	....	....	....	....	....	....
Total Assyout		**....**	**....**	**....**	**....**	**....**	**....**	**3000**	**....**	**3000**	**1000**	**....**	**1000**	**4000**	**....**	**4000**
Sohag Governorate:																
71	West Tahta	....	5700	....	....	....	....	....	....	....	....	....	....	5700	....	5700
85	East Touk Sons	....	....	....	....	....	....	4000	....	4000	5500	....	5500	9500	....	9500
Total Sohag		**....**	**5700**	**....**	**....**	**....**	**....**	**4000**	**....**	**4000**	**5500**	**....**	**5500**	**15200**	**....**	**15200**
Qena Governorate:																
78	West Esna	....	17000	....	....	....	....	....	....	....	....	....	....	17000	....	17000
79	Elredisa/Wadi Abadi	....	13200	....	....	....	....	....	....	....	....	....	....	13200	....	13200
82	Wadi Khrest/Shait	....	....	....	....	1552	1552	....	700	700	....	....	....	....	2252	2252
83	El-Marashdah	....	....	....	....	2300	2300	600	350	950	3750	....	3750	4350	2650	7000
86	West Girga	....	....	....	....	....	....	....	2000	2000	2000	1000	3000	2000	3000	5000
87	Wadi El-Lakitah	....	...	....	....	....	....	....	500	500	....	....	....	....	500	500
88	Wadi El-Saaidah	....	....	...	....	....	....	....	6000	6000	11200	8000	19200	11200	14000	25200
Total Qena		**....**	**30200**	**....**	**....**	**3852**	**3852**	**600**	**9550**	**10150**	**16950**	**9000**	**25950**	**47750**	**22402**	**70152**
Aswan Governorate:																
80	Kome Umbo	....	44000	2000	....	....	....	....	....	....	....	....	....	46000	....	46000
81	Around Nasser Lake	....	....	1850	1000	....	1000	....	....	....	....	....	....	2850	....	2850
Total Aswan		**....**	**44000**	**3850**	**1000**	**....**	**1000**	**....**	**....**	**....**	**....**	**....**	**....**	**48850**	**....**	**48850**
Total Upper Egypt		**....**	**144400**	**3850**	**1000**	**3852**	**4852**	**7600**	**9550**	**17150**	**23450**	**9000**	**32450**	**180300**	**22402**	**202702**

Source: Collected and tabulated from the GARPAD data by the study team.

Table B2-7: Area Reclaimed by Governorate-North West Coat, and New Valley Region-During the Period 1952-1997

Parcel Number	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
90	El-Frafrah	….	….	2000	1450	….	1450	24100	….	24100	11700	….	11700	39250	….	39250
92	West Mawhoub	….	….	1900	2400	….	2400	….	….	….	….	….	….	4300	….	4300
93	Baris	….	….	….	320	….	320	….	….	….	….	….	….	320	….	320
94	Sahl El-Zayat	….	….	….	500	….	500	….	….	….	250	….	250	750	….	750
95	Oweinat/Dakhla/Kharga	3000	41266	….	….	….	….	….	….	….	….	….	….	44266	….	44266
116	Sahl Frarin	….	….	….	….	….	….	….	….	….	2000	….	2000	….	2000	2000
Sub-Total North Coast/ N.Valley		**3000**	**41266**	**3900**	**4670**	**….**	**4670**	**24100**	**….**	**24100**	**13950**	**….**	**13950**	**88886**	**2000**	**90886**

Source: Collected and tabulated from the GARPAD data by the study team.

Table B2-8: Area Reclaimed by Governorate-Saini Region-During the Period 1952-1997

Parcel Number	Area	52/60	60/70	70/80	1982/1987 Plan			1987/1992 Plan			1992/1997 Plan			Total		
					Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
97	East Bitter Lakes	….	2000	3400	4000	1250	5250	14800	….	14800	3400	2000	5400	27600	3250	30850
98	El-Areesh	….	….	….	800	….	800	….	….	….	….	….	….	800	….	800
98	North East Coast	100	9258	900	….	….	….	….	220000	220000	….	33700	33700	10258	253700	263958
99	Meet Abou El-Kome	….	….	2700	5000	….	5000	….	….	….	….	….	….	7700	….	7700
100	El-Shabab Farms															
101	South Saini	….	….	….	….	….	….	….	….	….	….	28300	28300	….	28300	28300
Total Saini		**100**	**11258**	**7000**	**9800**	**1250**	**11050**	**14800**	**220000**	**234800**	**3400**	**64000**	**67400**	**46358**	**285250**	**231608**

Source: Collected and tabulated from the GARPAD data by the study team.

ANNEX C: PROPOSED CURRENT STATISTICS QUESTIONNAIRES

Farm Code: _____

The Agricultural Cooperative/Unit Manager

1) Do you send any of the following data to the district/supervisory level on a regular basis:
Yes _____ No _____

2) If yes, what types of data do you send?

Type of data: 1= Area 4= Sale prices
2= Production 5= Cost of production
3= Yield 6= Number of livestock

Please complete the following table about ag-crops (counting livestock as a crop):

Crop	Code	Type of Data				Lowest Level of Data Available	Source of Data	Method of Collection	Time Data Sent to District	Date Last Sent*	Verified Y or N

*Please mention the date

Lowest level of data:
1= Farm
2= Hodhe
3= Village/coop
4- Other

Source of data:
1= Field measurement
2= Farmer, without measurement
3= Extension agent/manager
4= Local markets
5= Other

Method of collection:
1= Formal sample
2= Pick a few here & there
3= Agent/manager judgement
4= Other: _____

Time data sent to district:
1= As they become available
2= On a regular basis
3= At the end of each season
4= Only when requested

3) When you get data from extension agents do you review it and verify it with them?

Yes _____ No _____

4) If yes, What do you do if you find inconsistency in the data? Please explain

_____

5) Do you review the extension agents notebooks?

Yes _____ No _____

6) If no, why not?

_____

7) If yes, do you enter any comments in the notebook indicating when and other comments? Yes _____ No _____

8) Do you review data in the extension agents notebooks against records in the co-op? Yes _____ No _____

9) In what form do you send this data to the district supervisory unit?

a. Use an official format prepared by the ministry _____

b. Use our own format as we see fit _____

c. Put in the form of a letter or report with data included _____

10) Do you keep a copy of the data you send to the district? No _____

Yes, photocopy _____ Yes, carbon copy _____ Yes, other (specify) _____

11) Do keep records of agricultural data that are seldom or never requested by your supervisor?

No _____ Yes, (specify) _____

12) Please indicate any of the following areas in which you have had some training?

(1) Statistics _____ (2) Sampling methods _____ (3) Extension method ____

(4) Marketing _____ (5) Data processing _____

13) Do farmers in your area face problems with salinity?

No _____ Yes, some places _____ Yes, many places _____

Yes, most places _____ Yes, everywhere _____

14) If yes, how severe is the problem in your opinion?

One. _____ Reduce yields 10% or less.
Two. _____ Reduce yields 11-25%.
Three. _____ Reduce yields 26-50%
Four. _____ Reduce yields more than 50%.
Five. _____ Other: _____

15) What kinds of problems constrains are harping you from doing a better job in your current position?

_____
_____
_____
_____

16) What do you suggest for solving these problems?

_____
_____
_____
_____

Farm Code: _____

Questionnaire for Agriculture Extension Agents

The interviewer should start by introducing himself to the agent and tell him about the purpose of the interview. The first few questions are introduced to put the agent at ease and assure him of the importance of the information he will give.

1) How long have you been working in this office? _____

2) Do you have any one assisting you in your work? Yes No

3) If yes, how many? _____ persons

4) Do you use a calculator in your work? Yes _____ No _____

5) If Yes, is it given to you by the co-op or do you have to provide your own?
Given to me _____ I get my own _____

6) Do you receive stationery and office supplies necessary for your work?
Yes _____ No _____

7) We have been told that most extension agents keep a small notebook to record various types of data about the area in his domain. Do you keep such a notebook?
Yes _____ No _____

IF NO, SKIP TO # 15

8) What is the size of the notebook you have?
Small _____ Medium _____ Large _____

9) Is it given to you by the co-op or do you have to provide your own?
Given to me _____ I get my own _____

10) Do you use a different notebook for each:
Crop _____ Season _____ Ag-year _____ Until Full _____

11) What level do you use in recording data in the notebook? (check all that apply)
Farmer _____ Farm _____ Crop _____ Parcel _____
Hodhe _____ Village _____ Cooperative _____

12) Do you divide your notebook into sections for different types of data?
Yes _____ No _____

13) If yes, what are the main sections you use?

_____ , _____ , _____
_____ , _____ , _____

14) If no, do you record data as they become available _____ or whenever you remember _____?

15) What are the main types of data you record at the farm level, if any? Include data on livestock.

Crop/Livestock	Area	Production	Yields	Prices	Number

16) If you record data on crop area at the farm level, how do you get them?

a. Measure the field _____
b. Visit the farm and ask the farmer _____
c. Visit the farmer at home _____
d. Invite farmer to the coop, and ask him _____
e. Ask a neighbor _____
f. Judge for your self _____
g. Other: (specify) _____

17) If you do not measure the field, do you make any attempt to verify the accuracy of the response? Yes _____ No _____

18) If yes, how do you do this?

_____
_____
_____

19) If you get data on production of field crops, how do you get them?

a. visit the farm before harvesting and make an estimate _____
b. visit the farm at harvesting time and make an estimate _____
c. examine the crop after packing and determine the quantity _____
d. ask the farmer and record his answer _____
e. ask a neighbor or a friend of the farmer _____
f. Other (specify) _____

20) How do you get information on production of vegetable crops?

a. Do not produce estimates.
b. Visit the farm before harvesting and make a judgemental estimate _____
c. Visit the farm at harvesting time and make an estimate _____
d. Ask the farmer after the last harvest _____
e. If there is more than one harvest, ask the farmer after the first harvest and make an estimate for the late ones _____
f. Other (specify) _____

21) How do you get information about production for fruits?

a. Do not produce estimates.
b. Visit the farm before harvesting and make a judgemental estimate _____
c. Visit the farm at harvesting time and make an estimate _____
d. Ask the farmer after the last harvest _____
e. If there is more than one harvest, ask the farmer after the first harvest and make an estimate for the late ones _____
f. Other _____

22) How do you get information about fruit prduction if the crop is sold on tree (Kalalah)
Please explain _____

_____
_____
_____

23) If you record data at the farm level, how do you obtain this informartion?

From all farmers _____ From most farmers _____
From a select few _____ From a formal sample _____

24) If you get data from select few, how do you select them?

Select some of those I consider average _____
Select some with good crop and some with less than good crops _____
Select some of those who are usually cooperative in giving data _____
Other, please explain _____

25) If you collect data from a sample of respondents, who decides on the size of the sample and its distribution among subgroups?

I do ____, The ag co-op manager ____The statistician at the district ___
The Statistics office at the directorate _____
The statistics office at the ministry as when forms include instruction on the size _____

26) Do you ask those you select about the cost they incurred in producing the crop?

Yes _____ No _____

27) If yes, do you ask them for the details of the cost? or just the total?

Details _____ Just the total _____

28) Do you ask them about the prices they get from selling their crops?

Yes _____ No _____

29) If yes, do they give prices?

Willingly _____ Reluctantly _____ Not at all _____

30) Do you make prelimenary estimates for crop production?

Yes _____ No _____

31) If yes, please indicate for which crops:

_____ _____ _____
_____ _____ _____
_____ _____ _____
_____ _____ _____

32) Do you record data on the age of fruit trees?
Yes _____ No _____

33) Do you keep a record of livestock in your notebook?
Yes _____ No _____

34) How much of the data which you record in your notebook do you transfer to official records?
All of it _____ None of it _____
Some of it _____, please explain _____
_____
_____

35) If you do record some of these data in official records, when do you do that?
Soon after collecting data _____ Some time after it is collected _____
When data is requested from other officials _____

36) How much of these data are sent to the statistical office in the district?
All of it _____ None of it _____ Some of it _____
As much as they ask for _____

37) Whenever data is sent to the district (whether on request or on your own initiative) do you keep a copy of it? Yes _____ No _____

38) If yes, in which form? Photocopy _____ Carbon copy _____

39) Does any one go over the data and verify them with you before they are sent to the district?
No, data are sent as it is recorded by me _____ Yes _____

40) If yes, who reviews the data with you ? _____

41) If data are found to contain some inconsistencies or in need of confirmation, do you go back to the source to confirm them?
Yes _____ No _____

42) If no, are they modified in the office to get the approval of the reviewer?
Yes _____ No _____(please explain what happens)
_____
_____

43) Do you get work assignments to cary out supplemental data collection activities?
Yes _____ No _____

44) If yes, does this happen on a regular basis? Yes _____ No _____

45) In what form do get these assignments? (check all that apply)
a. With written instruction as to how and when to collect the data _____
b. With written instruction as to how to collect data leaving when to us _____
c. With written instruction as to when to collect data leaving how to us _____
d. With specific forms to complete _____
e. Orally, during visits of either party to the other _____

46) If deadlines are set for data to be reported, are you given enough time to collect and report data?

a) No dead lines are set _____ b) Usually _____ c) Sometimes _____
d) Seldom _____ e) Never _____

47) Do the farmers you work with face problems with salinity?

No _____ Yes, in some place _____ Yes, in many places _____

Yes, in most places _____ Yes, everywhere _____

48) If yes, how severe is the problem, in your openion?

a. _____ Reduction in yields of 10% or less.
b. _____ Reduction in yields of 10-25%
c. _____ Reduction in yields of 26-50%
d. _____ Reduction in yields ? 50%
e. _____ Other (explain) _____

49) Are there any problems you face in your work, which prevent you from doing a better job?

_____
_____
_____
_____

50) What solutions do you see for resolving these problems?

_____
_____
_____
_____

Thank you for your cooperation and before we go do you mind if have a look at your notebook? Would it be possible to get a photocopy of some of the pages in the notebook?

Comments on notebook: _____
_____
_____
_____
_____

Ministry of Agriculture & Land Reclamation Questionnaire Code: _____
Agricultural Policy Reform Project
Monitoring, Verification, and Evaluation Unit

Questionnaire for Horticultural Specialist

(This information is confidential and will be used for the research purposes only)

Governorate: _____
District: _____
Name: _____
Position: _____

1) How long have you been at this post? _____ years

2) Were you assigned this position in accordance with your wish?
Yes _____ No _____

3) If no, what are the reasons for your assignment?
   1. Specialization
   2. Promotion
   3. Reward
   4. Others (specify) _____

4) How would you describe your workload?
   1. Too much
   2. About right
   3. Too little

5) What is your educational background in the field of Horticultural? _____
_____

6) Have you attended any special training courses in the field of horticulture?
Yes _____ No _____

7) If yes, which courses :
   ? _____
   ? _____
   ? _____

8) Have you attended any training courses in Statistics?
Yes _____ No _____

9) If yes, what are the courses?
? _____
? _____
? _____

10) Do you feel a need for more training in Statistics?
Yes _____ No _____

11) If yes, what are the courses
? _____
? _____
? _____

12) Do you have available the kind of equipment you need in order to do your job properly? Yes _____ No_____

13) How much is the area of new lands that falls under your jurisdiction?
_____ Feddans _____ I do not know the exact figure

14) What criterion do you use for defining new lands?
_____
_____
_____

15) Do you think that subordinate offices in the districts and officers in the field use the same or comparable definition? _____ Yes _____ No
Other: (explain) _____

16) If no or other, how do you handle these differences? _____
_____

17) What types of information do you collect/record on the new lands and what is its source?

Type of Information	Vegetables	Fruits	Source
Area			
Production			
Yield			
Cost of Production			
Prices			

I DO NOT COLLECT DATA ON THE NEW LANDS.
IF THE SPECIALIST DOES NOT COLLECT HORTICULTURAL DATA ON THE NEW LANDS, STOP HERE.

18) When you estimate horticulture yields at the village/unit level, how is yield estimated?
1. By formal sampling
2. By asking farmers
3. By witnessing the harvesting operation
4. Other (specify)

19) What are the important fruits/vegetables for which you estimate yield?
? _____
? _____
? _____

20) If you estimate the cost of production for horticultural crops in the new lands, at what level do you make your estimate?
1. Village cooperative level
2. District level
3. Governorate

21) How do you obtain data regarding new lands under the supervision of young graduates supervisors (and/or development supervisors if they are different)?
_____
_____

22) Are there any difficulties (relating to form or time or details) in obtaining these data? Yes _____ No _____

23) If yes, what do you suggest to overcome these difficulties?
_____
_____

24) How do you collect horticultural data from the new lands?
_____
_____
_____

25) If data are sampled how are the samples selected? _____
_____

26) Who makes decisions regarding the size of the sample in the sample surveys?
_____

27) Who decides the choice of the sample units themselves?
_____

28) Do you verify the horticultural data you get for the new lands?
Yes_____ No _____

29) If yes, how?
1. Verify all of the data at its source
2. Verify only part of the data at its source
3. Compare with last survey
4. Other (specify) _____

30) If no, indicate the reasons
   1. Because I trust the extension agent
   2. Because we have a good system
   3. Because I am not obliged to
   4. Other (specify) _____

31) Can we look at some of these data for the village of _____ and the village of _____?
_____
_____
_____

32) How do you aggregate horticultural data from the new lands for the whole district/governorate?
Area and Production: _____
_____
Yield: _____
_____
Cost of production: _____
_____

33) Do you report data for old and new lands separately?
Yes_____ No _____

34) If no, why not?
_____ It has not been requested
_____ I do not find any reason to do so
_____ All lands in the area are of one type (old-new)

35) Do you collect data regarding the type of irrigation system used in new lands?
Yes_____ No _____

36) To what authorities do you send data on horticultural in the new lands?

Authority	Level	Type of Data

Level codes: 1= village 2= district 3= governorate 4= MALR

37) Do you keep a record of these data?
Yes _____ No _____

38) If yes, do you have a time series of these data at your level?
Yes _____ No _____

39) If yes, how long is it? _____

40) Apart from equipment, what other constraints do you face in collecting and reporting horticultural statistics for the new lands in your area? _____

_____
_____
_____
_____
_____
_____

41) What would you recommend to improve the quality of your work and the data you provide? _____

_____
_____
_____
_____
_____
_____
_____

Ministry of Agriculture & Land Reclamation Questionnaire Code: _____
Agricultural Policy Reform Project
Monitoring, Verification, and Evaluation Unit

Questionnaire for Livestock Specialist

(This information is confidential and will be used for the research purposes only)

Governorate: _____
District: _____
Name: _____
Position: _____

1) How long have you been at this post? _____ years

2) Were you assigned this position in accordance with your wish?
Yes _____ No _____

3) If no, what are the reasons for your assignment?
   1. Specialization
   2. Promotion
   3. Reward
   4. Others (specify) _____

4) How would you describe your workload?
   1. Too much
   2. About right
   3. Too little

5) What is your educational background in the field of livestock? _____
_____

6) Have you attended any special training courses in the field of livestock apart from your formal education?
Yes _____ No _____

7) If yes, which courses :
   a) _____
   b) _____
   c) _____

8) Have you attended any training courses in Statistics?
Yes _____ No _____

9) If yes, what are the courses?
   a) _____
   b) _____
   c) _____

10) Do you feel a need for more training in Statistics?
Yes _____ No _____

11) If yes, what are the courses
   a) _____
   b) _____
   c) _____

12) Do you have available the kind of equipment you need in order to do your job properly? Yes _____ No_____

13) How much is the area of new lands that falls under your jurisdiction?
_____ Feddans _____ I do not know the exact figure

14) What criterion do you use for defining new lands?
_____
_____
_____

15) Do you think that subordinate offices in the districts and officers in the field use the same or comparable definition? _____ Yes _____ No
Other: (explain) _____

16) If no or other, how do you handle these differences? _____
_____

17) What types of information do you collect/record on the new lands and what is its source?

Type of Information	**Source**
Number, type, and age of animals	
Production of livestock products	
Livestock productivity	
Cost of Production	

IF THE SAMPLES DOES NOT COLLECT LIVESTOCK DATA ON THE NEW LANDS, THE REMAINING QUESTIONS WILL APPLY TO THE OLD LANDS.

18) How do you obtain data regarding new lands under the supervision of young graduates supervisories (and/or development supervisories if they are different)?
_____
_____

19) Are there any difficulties (relating to form or time or details) in obtaining these data? Yes _____ No _____

20) If yes, what do you suggest to overcome these difficulties?

_____

_____

21) How do you collect livestock data from the new lands?

_____

_____

_____

22) If data are sampled how are the samples selected? _____

_____

23) Who makes decisions regarding the size of the sample in sample surveys?

_____

24) Who decides the choice of the sample units themselves?

_____

25) Do you verify the livestock data you get for the new lands?
Yes_____ No _____

26) If yes, how?
1. Verify all of the data at its source
2. Verify only part of the data at its source
3. Compare with last survey
4. Other (specify) _____

27) If no, indicate the reasons
1. Because I trust the extension agent
2. Because we have a good system
3. Because I am not obliged to
4. Other (specify) _____

28) Can we look at some of these data for the village of _____ and the village of _____?

_____

_____

_____

29) How do you aggregate livestock data from the new lands for the whole district/governorate?

Livestock numbers: _____

_____

Milk production: _____

_____

Cost of production: _____

_____

30) To what authorities do you send data on livestock in the new lands?

Level	Authority	Type of Data

Level codes: 1= village 2= district 3= governorate 4= MALR

31) Do you report data for old and new lands separately?
Yes_____ No _____

32) Do you keep a record of these data?
Yes _____ No _____

33) If yes, do you have a time series of these data at your level?
Yes _____ No _____

34) If yes, how long is it? _____

35) Do you estimate the cost of production for livestock in the new lands?
Yes _____ No _____

36) If yes, at what level?
1. Village cooperative level
2. District level
3. Governorate

37) Apart from equipment, what other constraints do you face in collecting and reporting livestock statistics for the new lands? _____
_____
_____
_____
_____
_____
_____
_____

38) What would you recommend to improve the quality of your work and the data you provide? _____
_____
_____
_____
_____
_____
_____
_____

Farm Code: _____

Sampling Office

The sampling department may be the most likely candidate for making estimates for any of the agricultural components. It is the purpose of this simple questionnaire to obtain information about the possibility of having the sampling department make all estimates other than crop yield and production.

1) How many persons are working in this office? _____ Persons.

2) Please give us some idea of the responsibilities and activities of this office.

3) How much agricultural area is this office in charge of? _____ Feddans.

4) What are the crops you obtain estimates for?
_____, _____, _____, _____, _____, _____, _____
_____, _____, _____, _____, _____, _____, _____

5) After estimating yields do you make estimates of production?
Yes _____No _____

6) Do you make yield and production estimates by village or just for the district?
_____ Yield for each village _____ Production for the whole district
_____ Yield for district _____ Production for the village

7) What method do you use for estimating production from yield?
_____ Simple mean
_____ Weighted mean
_____ Other methods, please explain

8) From where do you get data about crop areas?

9) Do you think this data is usually accurate?
Yes _____ No _____

10) Would you prefer that your department obtain area estimates directly from the field?
Yes _____ No _____

11) Are you given a reasonable amount of time to complete your work?
_____ We usually get enough in time
_____ We rarely get enough time

12) Do you have more work to do in summer than in winter or vice versa?
_____ The same _____ More in summer _____ more in winter

13) Do you collect data on the new lands?
Yes _____ No _____

14) If yes, do you report on it separately?
Yes _____ No _____

15) To whom do you send your crop cutting results?
_____ , _____

16) When do you send your findings to them?
_____ As soon as they are obtained
_____ After being reviewed by _____
_____ At end of season

17) Who decides on the sample size used in crop cutting experiments?
_____

18) Do you participate in this process?
Yes _____ No _____

19) Did you attend any program on statistics or sampling in the last three years?
Yes _____ No _____

20) If yes, where?
_____

21) Do you have a computer in the office where you work?
Yes _____ No _____

22) If yes, do you use it in your work?
_____Always _____ sometimes _____ Never

23) What are the most serious obstacles that prevent you from doing your work to your satisfaction?
_____
_____

24) What do you suggest to overcome these difficulties?
_____
_____

25) Would there be any technical difficulty in having this department estimate or enumerate crop areas rather than get them from somewhere else?
Yes _____ No _____

26) Are there any administrative difficulties in having this department estimate or enumerate crop areas? Yes _____ No _____

27) If yes, what are these difficulties?
Technical: _____
Administrative: _____

28) If yes, what do you suggest to overcome these difficulties?
Technical: _____
Administrative: _____

The costs of production for various crops are obtained by estimating different factors that go into the production process and adding these factors up. This requires obtaining estimates for the amount of labor (divided into family labor and hired labor, the latter is divided into men, women, and children), the amount of animal labor (owned and hired), and the cost of machinery. This is to be computed for every process and stage of the production process. Estimates are also obtained for every material input used in the process (this include seeds and seedlings, fertilizers and pesticides).

29) Do you think that this department would find any technical or administrative difficulty in gathering this information at the farm level?
Technical: Yes _____ No _____
Administrative: Yes _____ No _____

30) If yes, what might these difficulties be?
Technical: _____
Administrative: _____

31) Do you think this department would have any technical or administrative difficulties in using these data to estimate costs of production?
Technical: Yes _____ No _____
Administrative: Yes _____ No _____

32) If yes, what might these difficulties be?
Technical: _____
Administrative: _____

33) If yes, What do you suggest to overcome these difficulties?
_____
_____
_____

34) Can you think of any technical or administrative difficulty in having this department carry out the process of obtaining estimates of livestock number and production of animal products?
Yes _____ No _____

35) If yes, what might these difficulties be?
Technical: _____
Administrative: _____

36) If yes, What do you suggest to overcome these difficulties?
_____
_____
_____

The statistician at the Agricultural Administration in the District

Governorate: _____ District: _____ Name: _____

1) How much is the area of new lands that falls under your jurisdiction?
_____ Feddans _____ I do not know the exact figure

2) Do you request separate data sets for the "new lands"?
Yes _____ No _____

3) If yes, do all offices reporting to you comply with this request?
_____ All of them _____ Some off them _____ None of them

4) What criterion do you use for defining new lands?
_____
_____

5) Do you think that subordinate offices in the districts and officers in the field use the same or comparable definition?
Yes _____ No _____
Other (explain) _____

6) If no or other, how do you handle these differences? _____
_____

7) New lands differ from old lands in many respects, what type of data do you collect from the new lands?

	Field Crops	**Vegetables**	**Fruits**
Area	_____	_____	_____
Production	_____	_____	_____
Yield	_____	_____	_____
Cost of production	_____	_____	_____
Prices	_____	_____	_____

8) How do you get crop area, production, cost and price data at the village or co-op level for the new lands?
I request them from the extension agents and they send them to this office _____
I visit the co-ops and get the needed data with the help of extension agents _____
I visit the field and collect the needed data on my own _____
Other: _____

9) In what form do you get these data from the co-op and village in the new lands?
One. In standard forms prepared by MALR for this purpose _____

Two. In a format prepared by this office _____
Three. In various formats according to the village _____

10) Do you have to do anything special to get data concerning horticulture crops in the new lands?
Yes _____ No _____

11) If yes, explain:
_____
_____

12) When do you get data for the new lands (check what applies to new lands)?
One. _____ At beginning of season
Two. _____ At midseason
Three. _____ At end of season

13) How do you obtain data regarding new lands regarding the supervision of young graduates supervisories (and/or development supervisories if they are different)?
_____
_____

14) Are there any difficulties (relating to form or time or details) in obtaining these data?
Yes _____ No _____

15) If yes, what do you suggest to overcome these difficulties?
_____
_____

16) Do you collect any data regarding livestock in new lands?
Yes _____ No _____

17) If yes, what type of data?
Numbers: _____
Production of livestock products: _____
Livestock productivity: _____

18) How do you collect data covering livestock for the new lands?
One. _____ I request from the extension agents.
Two. _____ I visit the co-ops and get the data.
Three. _____ I draw a profile of a typical livestock producers.
Four. _____ Other (explain)
_____

19) If data are sampled, how are the samples selected?

_____
_____

20) Who makes decisions regarding the size of samples surveys?
_____
_____

21) Who decides the choice of the sample units themselves?
_____

22) Do you verify any of these data that you get for the new lands?
Yes _____ No _____

23) If yes, do you verify systematically, or only if the data do not seem right?
Systematically _____ Only if they do not seem right _____

24) In either case, how is this verification done? (please explain)
For horticultural crops: _____
For livestock: _____

25) If some of the data items are found not to conform, what do you do?
One. Correct these items only _____
Two. Check the rest of the village data and correct as needed _____

26) If you do not verify the data, please explain why?
One. _____ I trust the extension agents.
Two. _____ I do not have the resources to do this.
Three. _____ I am not obliged to do this.
Four. _____ Other (explain)
_____

27) How long do you hold data sheets relating to the new lands for any specific season?
_____

28) Do you keep a register of these data at the agricultural directorate?
Yes _____ `No, only the data sheets or tables are being kept _____

29) Do you aggregate this type of data for the whole district?
Yes _____ No, data are kept in the form they come in to the directorate _____

30) Do you collect data regarding the type of irrigation system used in new lands?
Yes _____ No _____

31) Do you report data for old and new lands separately?
Yes _____ No _____

32) If no, why not?
_____ It have not been requested
_____ I do not find any reason to do so
_____ All lands in the area are of one type (old-new)

33) Which of the following data items about agricultural crops in the new lands are available in the district at the village level?

	Field Crops	Vegetables	Fruit Trees
Area			
Production			
Cost of Production			
Selling Prices			

34) In what form are these data sent to the Agricultural Affairs Department at the Governorate?
One. In special forms prepared for this purpose by the directorate _____
Two. In aggregated tables prepared by us _____
Three. In a letter or note summarizing the data for the whole district _____

35) Do you keep a copy of the data in the same format that you send to the governorate?
Yes _____ No _____

36) When are these data sent to the governorate?
As soon as they are collected and aggregated _____
On specific dates preset for the data to be sent _____

37) Can you tell us the date these data for the summer season were sent?
_____

38) Do you collect these data on a preliminary basis and on final basis?
One. Yes, preliminary and final _____
Two. Only on a final basis _____

39) If yes, do you keep a register for the preliminary data?
Yes _____ No _____

40) Do you keep a register for the final estimate?

Yes _____ No _____

41) When do you get data for the new lands (check what applies to new lands)?
One. _____ At beginning of season
Two. _____ At midseason
Three. _____ At end of season

42) What is the highest diploma you hold?
- B.Sc. Agriculture
- B.Sc. Non Agriculture
- High School Agriculture
- High School Non Agriculture

43) Did you attend training program in either of the following:
- Statistics Yes _____ No _____
- Statistic Sampling Yes _____ No _____
- Agriculture Extension Yes _____ No _____
- Animal Production Yes _____ No _____
- Horticulture Yes _____ No _____
- Data Processing Yes _____ No _____

44) What kinds of problems or constraints are keeping you from doing a better job in your current position?

_____
_____
_____
_____

45) What do you suggest for solving these problems?

_____
_____
_____
_____

The statistician at the Agricultural Administration in the Governorate

Governorate: _____ Name: _____

1) How much is the area of new lands in your governorate?
_____ Feddans _____ I do not know the exact figure

2) How much of this falls under your jurisdiction?
_____ Feddans _____ I do not know the exact figure

3) Do you request separate data sets for the "new lands" from the districts?
Yes _____ No _____

4) If yes, do all offices reporting to you comply with this request?
_____ All of them _____ Some off them _____ None of them

5) What criterion do you use for defining new lands?
_____
_____

6) Do you think that subordinate offices in the districts and officers in the field use the same or comparable definition?
Yes _____ No _____
Other (explain) _____

7) If no or other, how do you handle these differences? _____
_____

8) New lands differ from old lands in many respects, what type of data do you collect from the new lands?

	Field Crops	**Vegetables**	**Fruits**
Area	_____	_____	_____
Production	_____	_____	_____
Yield	_____	_____	_____
Cost of production	_____	_____	_____
Prices	_____	_____	_____

9) How do you get crop area, production, cost and price data at the village or co-op level for the new lands?
_____
_____
_____
_____

10) In what form do you get these data from the districts for the new lands?
One. In standard forms prepared by MALR for this purpose _____
Two. In a format prepared by this office _____
Three. In various formats according to the village _____

11) Do you have to do anything special to get data concerning agricultural crops in the new lands?
Yes _____ No _____

12) If yes, explain: _____
_____

13) When do you get data for the new lands (check what applies to new lands)?
One. _____ At beginning of season
Two. _____ At midseason
Three. _____ At end of season

14) How do you obtain data regarding new lands under the supervision of young graduates supervisories (and/or development supervisories if they are different)?
_____
_____

15) Are there any difficulties (relating to form or time or details) in obtaining these data?
Yes _____ No _____

16) If yes, what do you suggest to overcome these difficulties?
_____
_____

17) How much area under cultivation in the new lands in your governorate falls outside of the supervision of the graduates project or of the district agricultural directorate?
One. Total area of new lands under cultivation _____
Two. Area supervised by graduates project _____
Three. Area supervised by the agricultural directorate _____
Four. Area not supervised by either one _____

18) How do you collect data covering livestock for the new lands?
One. Get it all from the district livestock offices _____
Two. Make estimates at the governorate level based on experience _____
Three. Do not collect data on livestock from the new lands._____
Four. Other (explain)
_____

19) How much verification do you perform on the data (on the new lands) sent to you from the districts?
Most or all of it _____ A certain percentage of data (please specify) _____
An unspecified percentage or number of cases _____ None at all _____

20) If data you receive on new lands are found to be incorect or suspect, what do you do to correct the situation?
_____
_____

21) Do you use any of the following statistical measures in your work? (put an X)
Weighed average _____ Variance _____
Standard deviation _____ Others (specify) _____

22) Do you perform any kind of statistical analysis on the data in your office?
No _____
Yes, _____ (please specify)

23) How long a time series on data on crop area horticultural production and number of livestock at the governorate level is available in the office?
One. Field crops _____ years
Two. Horticultural crops _____ years
Three. Number of livestock _____ years

24) At which level are these data available in the office?
All districts _____ Some districts _____ None of the districts _____
All villages _____ Some villages _____ None of the villages _____

25) Do you collect data regarding the type of irrigation system used in new lands?
Yes _____ No _____

26) Do you report data for old and new lands separately?
Yes _____ No _____

27) If no, why not?
_____ It have not been requested
_____ I do not find any reason to do so
_____ All lands in the area are of one type (old-new)

28) To which department do you send data on the new lands which you collect?
One. _____ MALR, Statistics Directorate
Two. _____ MALR, Agricultural Affairs Directorate
Three. _____
Four. _____

29) In what form do you send ag-data on the new lands to the statistical office at the ministry?

Table sprepared for this purpose by the ministry: _____

Tables prepared by this office using a format we see appropriate _____

Letter note summarizing the data _____

30) What do you use to send data to the ministry?

Photocopy _____ Carbon copy _____ On a computer diskette _____

31) When are these data sent to the ministry?

As soon as they are collected and completed _____

On specific dates preset for the data to be sent _____

32) Can you tell us the date these data for the summer season were sent in?

_____

33) Do you collect these data on a preliminary basis and on final basis?

One. Yes, preliminary and final _____

Two. Only on a final basis _____

34) If yes, do you keep a register for the preliminary data?

Yes _____ No _____

35) How often do you get requests from the ministry to modify your data to fit with plan objectives or figures from other governorates?

Frequently _____ Sometimes _____ Rarely _____ Never _____

36) When data are required from a sample of cases, who decides on the number of cases to be used?

The ministry _____ This office _____ The district office _____

The officer in the field _____

37) Who decides on the way cases are collected?

The ministry _____ This office _____ The district office _____

The officer in the field _____

38) What type of sampling frame does your office maintain to collect data on production and cost? Please explain in detail _____

_____

_____

39) What is the highest diploma you hold?

- B.Sc. Agriculture
- B.Sc. Non Agriculture

- High School Agriculture
- High School Non Agriculture

40) Did you attend training program in either of the following:

- Statistics Yes _____ No _____
- Statistic Sampling Yes _____ No _____
- Agriculture Extension Yes _____ No _____
- Animal Production Yes _____ No _____
- Horticulture Yes _____ No _____
- Data Processing Yes _____ No _____

41) What kinds of problems or constraints are keeping you from doing a better job in your current position?

_____
_____
_____
_____

42) What do you suggest for solving these problems?

_____
_____
_____
_____

IS IT POSSIBLE TO LOOK AT SOME OF YOUR RECORDS TO SEE HOW SOME OF THE DATA ITEMS ARE RECORDED AND HOW THE RECORDS ARE ORGANIZED?

_____
_____
_____
_____
_____
_____

ANNEX D: CROP CUTTING SURVEY PROCEDURES

CROP CUTTING SURVEY METHODOLOGY

Crop cutting surveys are conducted to estimate yield or total acreage under crop. The sampling may involve one, two, or more stages depending upon whether the area is to be covered intensively or a small sample is being drawn from a large area. In crop cutting surveys, information is obtained by direct observation and measurement without depending on responses from the operator of the holding. Response errors may be reduced considerably by such methods since it does not depend on the operator's knowledge or memory.

Crop cutting surveys have been used in Egypt since 1955. The general administration for sampling at MALR is responsible for crop cutting surveys to obtain estimates of yield for basic crop and some vegetable.

The procedure used by the sampling office is a stratified multi-stage-sampling scheme. The scheme is carried out in each governorate. Governorates are different population and not different strata. The procedure is explained briefly for one crop in a governorate.

1) The governorate is divided into strata. At the first stage a stratum is either a district or part of a district.

2) At the second stage each district is divided into strata as to the presence and year of implementation of tile drainage.

3) Land in each village (with a stratum) is divided into nearly equal groups, each group contains 150-200 feddans. A group constitutes, for the most part, a hode but it may contain more than one hode or it may be part of a hode.

4) The number of sampling experiments (each sampling experiment contains two fields) to be conducted for the whole governorate is determined based on the accuracy level wanted and on the variance as estimated from last year data through a detailed analysis of variance procedure.

5) Estimates of area under crop in each district are obtained from the agricultural administration in the district and verified through a 50% survey by the ESA. If major difference between the two sources exist, they have to be reconciled first.

6) The total number of sampling experiments (groups) obtained in step (4) is distributed among strata in proportion to areas under crop in strata.

7) A random sample of the groups is selected from each stratum.

8) A list of fields cultivated by the farmers growing the crop within each of the groups selected is obtained through the agricultural coop of the domain where the group falls.

9) The fields within the group are numbered serially in a certain sequence.

10) Two fields are chosen at random from each group selected above.

11) The fields selected are surveyed for contiguity and if necessary the field is divided in internally contiguous quadrangles. For the most part each field consists of one contiguous piece and it may be divided into four pieces at most.

12) If the field consists of more than one quadrangle, one of them is selected at random. This one selected is where the crop cutting experiment is to take place.

13) The length and width of the quadrangle selected are measured.

14) The initial random coordinate of the southwest corner of a rectangle is determined at random in such a way that the whole rectangle falls within the quadrangle. The polts are 2x2 meters for crops that are broadcast or 3x3.5m if planted in rows.

15) Special tools are used to set up the rectangle within the quadrangle to parallel the length of the field. The rectangle is marked using tape.

16) The area of the rectangle is measured carefully and precisely and planted within the rectangle and determined clearly.

17) The rectangle is harvested according to preset plans and weighted. The yield in a strata is calculated as the arithmetic mean of experiments within groups.

Note:
It is not enough in a crop cutting survey to select a sample of fields representative of the total number under the crop and sample-harvest the selected fields at the time of the visit of the enumerator. It is also necessary to ensure that the selected fields are reached on the dates the cultivators would harvest them. The procedure of sample-harvesting should also correspond, in so far as possible, to the one adopted to what is gathered by the cultivator, which is what one wants to estimate.

ANNEX E: SOME EXAMPLES OF MALR DATA ON THE NEW LANDS

Table E-1: Total Area for Vegetable Crops for Old and New Lands as in 1998

Governorate	Total Area in Feddans (for Three Seasons)			Total Area in Feddans (for Winter Vegetables)		
	New Lands	Old Lands	Total	New Lands	Old Lands	Total
Alexandria	2,941	103,314	106,255	2,941	18,555	21,496
Beheira	11,506	194,044	205,550	11,506	3,296	44,202
Gharbia	-	35,539	35,539	-	6,968	6,968
Kafr El Sheikh	-	37,846	37,846	-	9,918	9,918
Dakahlia	-	45,274	45,274	-	6,612	6,612
Damietta	420	17,174	17,594	420	2,520	2,940
Sharkia	33,511	78,050	111,561	33,511	13,132	46,643
Ismailia	67,073	933	68,006	33,097	933	33,030
Port Said	23	32	55	23	-	23
Suez	1,925	4,495	6,420	1,925	527	2,452
Menofia	2,585	34,246	36,830	2,584	983	3,567
Qalubia	4,680	34,329	39,009	4,680	14,836	19,516
Cairo	-	1,672	1,672	-	523	523
Giza	21,455	91,519	112,974	21,455	15,986	37,441
Beni Suef	2,511	32,270	34,781	2,511	1,181	3,692
Fayoum	5,643	50,479	56,122	5,643	10,459	16,102
Menya	6,280	80,016	86,296	6,280	10,241	16,521
Assuit	2,511	6,473	8,984	2,511	21,012	23,523
Sohag	4,212	18,459	22,671	4,212	7,027	11,239
Qena	75	40,858	40,933	75	25,253	25,328
Aswan	3,618	10,879	14,497	3,618	8,120	11,738
Luxor	112	1,450	1,562	112	735	847
Total inside the valley	**171,080**	**919,351**	**1090,431**	**137,104**	**208,217**	**345,321**
New Valley	4,124	-	4,124	2,056	-	2,056
Matrouh	33,154	-	33,154	3,463	-	3,463
Red Sea	-	-	-	-	-	-
North Sinai	13,109	-	13,109	7,661	-	7,661
South Sinai	68	-	68	-	-	-
Nubaria	320,123		320,123	76,865	-	76,865
New Lands				162	-	162
Total out of valley	**370,578**	**-**	**370,578**	**90,207**	**-**	**90,207**
GRAND TOTAL	**541,658**	**919,351**	**1461,009**	**227,311**	**208,217**	**435,528**

Source: MALR, Economic Affairs Sector, Agricultural Statistics Year Book.

Table E-2: Area , Yield and Production of Summer Vegetables 1998

	Tomatoes			Total	
Governorate	**Production/Ton**	**Yield**	**Area/Feddan**	**Production/Ton**	**Area/Feddan**
Alexandria	196180	15.89	12345	466491	47339
Behira	268320	11.54	23245	551590	77037
Gharbia	30372	17.15	1771	47254	4349
Kafr El Sheikh	87904	10.18	8634	178209	16897
Dakahlia	52817	11.64	4538	77266	8089
Damietta	22916	9.56	2398	54360	5682
Sharkia	162096	13.57	11943	363959	33750
Ismailia	100539	25.24	3984	148903	11529
Port Said	-	-	-	191	32
Suez	17220	12	1435	25417	2507
Menufia	1547	7.97	194	20785	2872
Qalyoubia	85263	16.5	5166	182882	13695
Cairo	1177	7.95	148	4788	619
Lower Egypt	1026351	13.54	75801	2122095	224397
Giza	177516	16.91	10496	380163	31189
Beni Suef	71712	14.33	5003	85083	7691
Fayoum	2143	10.99	195	33893	5857
Minya	75010	16.31	4600	106575	8649
Middle Egypt	326381	16.08	20294	605714	53386
Assuit	57934	14.38	4028	92660	9297
Suhag	11212	16.2	692	30716	2966
Qena	4559	18.53	246	18612	2228
Aswan	2845	5	569	13479	2498
Luxor	1333	15.5	86	4958	565
Upper Egypt	77883	13.86	5621	160425	17554
Total	1430615	14.06	101716	2888234	295337
New Valley	656	7.54	87	2656	440
Matrouh	88669	9.83	9016	96567	11586
Red Sea	-	-	-	-	-
North Sinai	10364	11.5	901	13798	1537
South Sinai	325	14.13	23	407	37
Nubaria	946542	11.22	84373	1226351	132585
New Lands	345938	9.87	35051	514588	61847
Total	**1392494**	**10.76**	**129451**	**1854367**	**208032**
Grand Total	**2823109**	**12.21**	**231167**	**4742601**	**503369**

Source: MALR, Economic Affaris Sector, Agricultural Statistics Year Book.

Table E-3: Area , Yield and Production of Summer Vegetables 1998

(Area: Feddan & Production: Ton & Yield: Ton)

Governorate	Dry Kidney Beans			Dry Beans		
	Production	**Yield**	**Area**	**Production**	**Yield**	**Area**
Alexandria	-	-	-	-	-	-
Behira	2462	0.95	2603	11849	1.04	11409
Gharbia	182	0.87	210	267	0.82	325
Kafr El Sheikh	69	0.82	84	-	-	-
Dakahlia	-	-	-	-	-	-
Damietta	108	0.76	142	-	-	-
Sharkia	19	1	19	23	1	23
Ismailia	-	-	-	-	-	-
Port Said	-	-	-	-	-	-
Suez	-	-	-	-	-	-
Menufia	-	-	-	283	1.39	203
Qalyoubia	-	-	-	-	-	-
Cairo	-	-	-	-	-	-
Lower Egypt	2840	0.93	3058	12422	1.04	11960
Giza	-	-	-	-	-	-
Beni Suef	1644	1.26	1308	-	-	-
Fayoum	601	1.22	493	-	-	-
Minya	-	-	-	-	-	-
Middle Egypt	2245	1.25	1801	-	-	-
Assuit	3717	1.57	2370	-	-	-
Suhag	3	1	3	-	-	-
Qena	470	5	94	-	-	-
Aswan	-	-	-	-	-	-
Luxor	-	-	-	-	-	-
Upper Egypt	4190	1.7	2467	-	-	-
Total	9275	1.27	7326	12422	1.04	11960
New Valley	-	-	-	-	-	-
Matrouh	-	-	-	-	-	-
Red Sea	-	-	-	-	-	-
North Sinai	-	-	-	-	-	-
South Sinai	-	-	-	-	-	-
Nubaria	6767	1.34	5061	13804	1.54	8978
New Lands	1890	4.04	468	-	-	-
Total	**1904**	**4.01**	**475**	**13804**	**1.54**	**8978**
Grand Total	**36323**	**4.16**	**8740**	**26226**	**1.25**	**20938**

Source: MALR, Economic Affaris Sector, Agricultural Statistics Year Book.

Table E-4: Area , Yield and Production of Summer Vegetables 1998

(Area: Feddan & Production: Ton & Yield: Ton)

Governorate	Grean Beans			Squash		
	Production	Yield	Area	Production	Yield	Area
Alexandria	18676	5.76	3242	76493	7.79	9816
Behira	23194	5.19	4467	64347	7.99	8050
Gharbia	308	2.59	119	4111	8.69	473
Kafr El Sheikh	127	4.38	29	8701	6.17	1410
Dakahlia	1730	5.49	315	1021	8.73	117
Damietta	-	-	-	145	6.04	24
Sharkia	2856	4.17	685	23869	8.83	3495
Ismailia	2734	3.51	779	7155	6.64	1077
Port Said	-	-	-	-	-	-
Suez	-	-	-	495	7.5	66
Menufia	2157	2.96	729	417	10.69	39
Qalyoubia	3146	6.6	477	14756	12.01	1229
Cairo	-	-	-	64	4	16
Lower Egypt	54928	5.07	10842	201574	7.81	25812
Giza	19633	5.14	3817	19372	8.24	2352
Beni Suef	169	2.35	72	604	8.88	68
Fayoum	1988	4.48	444	8522	8.07	1056
Minya	723	5.83	124	1147	8.43	136
Middle Egypt	22513	5.05	4457	29645	8.21	3612
Assuit	-	-	-	94	5.53	17
Suhag	-	-	-	1259	9.4	134
Qena	3	3	1	14	3.5	4
Aswan	-	-	-	364	4.39	83
Luxor	-	-	-	-	-	-
Upper Egypt	3	3	1	1731	7.27	238
Total	77444	5.06	15300	232950	7.85	29662
New Valley	-	-	-	226	5.65	40
Matrouh	-	-	-	4218	2.97	1420
Red Sea	-	-	-	-	-	-
North Sinai	-	-	-	318	5.48	58
South Sinai	-	-	-	40	8	5
Nubaria	-	-	-	126591	7.49	16898
New Lands	-	-	-	47001	7.33	6408
Total	**8491**	**5.09**	**1667**	**178394**	**7.18**	**24829**
Grand Total	**85935**	**5.06**	**16967**	**411344**	**7.55**	**54491**

Source: MALR, Economic Affaris Sector, Agricultural Statistics Year Book.

ANNEX F: FARMER QUESTIONNAIRE AND ENUMERATOR MANUAL

Ministry of Agriculture and Land Reclamation
Economic Affairs Sectors
Central Directorate of Agricultural Economics

Governorate: _____|___|
District: _____|___|
Village: _____|___|

Type of Farmer: (Beneficiary, Investor, Graduate, other)
Farm Number: |____| Farmer Name: Farm Size: F_____ K _____
Date land first produced: Mon.____ Yr _____

Cropping Pattern For 1998/1999 Season

Season	Field No.	Crop & Variety		Planting Method		Area	Irrg. System	Water Source	Production			Fruit Trees		COP Code
			Code	Code	# Crops in field	F K			Unit	Code	Qty	Age	Training System	

Irrigation System
1= Surface
2= Pump & Surface
3= Sprinkler
4= Drip Irrigation

Source of Water
1= Canal
2= Underground
3= Rain
4= Mixed

Quantity codes
1= Ton
2= Ardab
3= Kentar
4= Cutting
5= Other: (specify) _____

Training System:
1= Arbor
2= Head
3= Trellis

Planting Method:
1= Pure/single
2= Intercropped with fruit trees
3= Intercropped but not with fruit trees

COP Code:
1= Data are per feddan
2= Data are for entire field
3= Data cover more than one field

Season:
W= winter
S = Summer
N= Nili

*** BEGIN WITH TREE CROPS IN CROP CODES.**

Gv Di Vi Fm

Power Inputs and Costs: Field Crops

Filed/Crop | | | | |

Farming Activity		Human Power										Animal Power				Machinery Power		
		Family Labor			Hired Labor							From Farm	Hired					
Code		Man Days	Woman Days	Child Days	Men Days	Men Rate	Women Days	Women Rate	Children Days	Children Rate	Total Hired Labor	Days	Days	Rate/ Day	Cost	Hour	Rate/ Hour	Cost
01	Manure Transport & Applic.																	
02	Land Preparation																	
03	Planting																	
04	Reseeding																	
05	Thinning																	
08	Irrigation																	
09	Chem. Fert.Application																	
10	Hoeing & Weeding																	
11	Chem. Pest Control																	
13	Harvest																	
14	Threshing & Winnowing																	
15	Sorting & Packing:																	
16	Load / Transport: Main Product																	
17	Load /Transport: By-Products																	
18	Removal of crop Residues																	
	Other Activities (specify)																	

Gv Di Vi Fm

Power Inputs and Costs: Fruit Trees

Filed/Crop | | | | |

Code	Farming Activity	Human Power										Animal Power				Machinery Power		
		Family Labor			Hired Labor							From Farm	Hired					
		Man Days	Woman Days	Child Days	Men Days	Men Rate	Women Days	Women Rate	Children Days	Children Rate	Total Hired Labor	Days	Days	Rate/ Day	Cost	Hour	Rate/ Hour	Cost
01	Manure Transport & Applic.																	
02	Land Preparation																	
06	Pruning & Suckering																	
08	Irrigation																	
09	Chem. Fert.Application																	
10	Hoeing & Weeding																	
11	Chem. Pest Control																	
13	Harvest																	
15	Sorting / Packing:																	
16	Loading/Transport:Main Product																	
17	Loading Transport: By-Product																	
19	Guarding																	
	Other Activities (specify)																	

Gv	Di	Vi	Fm

Power Inputs and Costs: Vegetable Crops

Filed/Crop | | | | |

Code	Farming Activity	Human Power										Animal Power				Machinery Power		
		Family Labor			Hired Labor							From Farm	Hired					
		Man Days	Woman Days	Child Days	Men Days	Men Rate	Women Days	Women Rate	Children Days	Children Rate	Total Hired Labor	Days	Days	Rate/ Day	Cost	Hour	Rate/ Hour	Cost
01	Manure Transport & Applic.																	
02	Land Preparation																	
03	Planting																	
04	Reseeding &Replanting																	
05	Thinning																	
07	Staking																	
08	Irrigation																	
09	Chem. Fert.Application																	
10	Hoeing & Weeding																	
11	Chem. Pest Control																	
12	Mulching *																	
13	Harvest																	
15	Sorting & Packing:																	
16	Load /Transport: Main Product																	
17	Load &Transport: By-Product																	
18	Removal of crop Residues																	

19	Guarding																	
	Other Activities (specify)																	

* Straw or Plastic

Gv, Di Vi Fm

Costs of Material Inputs : Field Crops

Filed/Crop | | | | |

Code	Type of Input	Quantity	Unit	Code	Price/Unit	Costs
01	Seeds					
10	Manure					
02	Ammon.Sulfate15.5%					
03	Ammon.Nitrate 33.5%					
04	Urea 46.5%					
05	Single Super Phosphate 15.5%					
06	Triple Super Phosphate 46.5%					
07	Potassium Sulfate 48.0%					
	Leaf Fertilizers N P K					
	Compound N P K					
	Other Chem. Fert. (specify)					
15	Chemical Pesticides					
18	Packaging Materials					
	Other Materials (specify)					
	Other Expenses (specify)					
25	Electricity / Fuel Cost for Irrigation of this crop/field					
26	Electricity / Fuel Cost for Irrigation of all fields					
30	Permanent labor-all crops					
31	Permanent labor-this crop					
32	Matching Materials					

Gv Di Vi Fm

Costs of Material Inputs : Fruit Trees

Filed/Crop | | | | |

Code	Type of Input	Quantity	Unit	Code	Price/Unit	Costs
10	Manure					
02	Ammon.Sulfate15.5%					
03	Ammon.Nitrate 33.5%					
04	Urea 46.5%					
05	Single Super Phosphate 15.5%					
06	Triple Super Phosphate 46.5%					
07	Potassium Sulfate 48.0%					
	Leaf Fertilizers N P K					
	Compound N P K					
	Other Chem. Fert. (specify)					
15	Chemical Pesticides					
18	Packaging Materials					
	Other Material (specify)					
	Other Expenses (specify)					
25	Electricity / Fuel Cost for Irrigation of this crop/field					
26	Electricity / Fuel Cost for Irrigation of all fields					
30	Permanent labor-all crops					
31	Permanent labor-this crop					
32	Matching Materials					

Gv Di Vi Fm

Costs of Material Inputs : Vegetable Crops

Filed/Crop | | | | |

Code	Type of Input	Quantity	Unit	Code	Price/Unit	Costs
01	Seeds					
10	Manure					
02	Ammon.Sulfate15.5%					
03	Ammon.Nitrate 33.5%					
04	Urea 46.5%					
05	Single Super Phosphate 15.5%					
06	Triple Super Phosphate 46.5%					
07	Potassium Sulfate 48.0%					
	Leaf Fertilizers N P K					
	Compound N P K					
	Other Chem. Fert. (specify)					
15	Chemical Pesticides					
16	Mulching Material *					
17	Stakes & Wires					
18	Packaging Materials					
	Other Materials (specify)					
	Other Expenses (specify)					
25	Electricity / Fuel Cost for Irrigation of this crop/field					
26	Electricity / Fuel Cost for Irrigation of all fields					
30	Permanent labor-all crops					
31	Permanent labor-this crop					
32	Matching Materials					

* Straw and plastic

Marketing Channels

Filed Crops | | | | | Total Production:

Marketing		Main Product					By-Product				
Code	Channel	Quantity	Unit	Code	Price/unit	Value	Quantity	Unit	Code	Price/unit	Value
01	Home Consumption										
02	Contracting										
03	Kilalah										
04	On Farm										
05	Village/local market										
06	Cooperative										
07	District Market										
08	Governorate Market										
09	Direct Export										
	Others (specify)										
10	Direct Processing										
11	Storage										
Total											

Marketing Channels

Fruit Trees | | | | | Total Production:

Marketing		Main Product					By-Product				
Code	Channel	Quantity	Unit	Code	Price/unit	Value	Quantity	Unit	Code	Price/unit	Value
01	Home Consumption										
02	Contracting										
03	Kilalah										
04	On Farm										
05	Village/local market										
06	Cooperative										
07	District Market										
08	Governorate Market										
09	Direct Export										
	Others (specify)										
10	Direct Processing										
11	Storage										
Total											

Marketing Channels

Vegetable Crops |__|__| |__|__| Total Production:

Marketing		Main Product					By-Product				
Code	Channel	Quantity	Unit	Code	Price/unit	Value	Quantity	Unit	Code	Price/unit	Value
01	Home Consumption										
02	Contracting										
03	Kilalah										
04	On Farm										
05	Village/local market										
06	Cooperative										
07	District Market										
08	Governorate Market										
09	Direct Export										
	Others (specify)										
10	Direct Processing										
11	Storage										
Total											

Gv	Ds	Vi	Fm

Livestock Holdings: Farm Level

Sex/Age/Type				Cattle: Baladi	Cattle: Cross	Cattle: Exotic	Buffalo	Goats	Sheep	Swine	Camels	Donkeys	Horses & Mules	Draft Cattle
Females	Under one year	Suckling												
		Weaned												
	One-Two years old													
	More than two years old	Heifers*												
		Cows												
		Method of Insemin.	Artificial											
			Natural											
	Total Females													
Males	Under one year	Suckling												
		Weaned												
	One-Two years old													
	Over two years	Fattening												
		Breeding												
	Total Males													
Grand Total														

*Females which have not yet calved.

Gv	Ds	Vi	Fm

Poultry Production: Farm Level

Item			Layers		Broilers		Turkey	Geese + Ducks	Rabbits
			Battery	Ground	Battery	Ground			
Number of Houses Only	Non-working	3000 birds							
		5000 birds							
		Other*							
	Working	3000 birds							
		5000 birds							
		Other*							
Layers	Number of poulets								
	Number of hens								
	Avg. eggs/hen/year								
	Total eggs produced								
Meat	Total batch capacity (Number of birds/animals)								
	Average batch size (Number of birds/animals)								
	Number of batches/year								
	Total units sold/slaughtered								

*Specify

Gv	Ds	Vi	Fm

Meat, Milk, Wool & Manure Production: Farm Level

Product			Cattle Baladi	Cattle Cross	Cattle Exotic	Buffalo	Goats	Sheep	Camels	Swine
MILK	Age at first calving (mos)									
	Avg. calving intervals									
	Avg. lactation duration (mos)									
	Average yield per cow (kgs/day)	After 1st month								
		Before last month								
		Total lactation								
	Total production (12 months) (kgs)									
MEAT	Number slaughtered at home									
	Avg. live weight (Kgs)									
Change in Stock	Purchased									
	Sold									
	Avg. live weight (Kgs) of sales									
Wool-total production (Kgs)										

MANURE	Unit of measure	
	Number of units produced	
	Number of units sold	
	Price per unit	
	Total sales	

ENUMERATOR MANUAL

Cropping Pattern/Cost of Production Questionnaire

Cropping Pattern: Record the total farm size at the top of the first page before beginning to fill out specific crop data. You will use this number to compare the total area reported to help ensure that you have listed all fields and have included all crops on the fields.

Begin by recording the most recent season harvested in the first column. Then list fields planted during that season, beginning with tree crops first since their production cycle will span more than one season. Start with the largest tree crop field; give each field a unique code from one to n. Record the crop and the variety on the same line. Leave the crop codes blank; we will insert a single crop/variety code later.

After you list the first tree crop field and its area, ask if there are any other crops planted in the field. If there are more than two other ones, list the two next most important ones according to the farmer. Do not list more than two crops in addition to the main crop; ignore the others. Then list the area occupied by each crop in the field, as though it were sole cropped, i.e. without adjusting for intercropping.

After all of the crops found in one field are listed, go back and record the planting method for each crop. The main tree crop will receive a code 2, unless it is pure cropped, in which case it is code 1. All crops intercropped with it should also receive a code of 2. In this way the computer can be programmed to calculate density adjusted surface area as the area in each crop, divided by the area in all crops on the field, times the total area of all crops in the field. With this approach virtually any algorithm can be applied to dealing with intercropping at a later date if desired, but in the short run, total area cultivated will equal the total size of the cultivated holding.

Continue listing all of the farmer's tree crop fields and the other crops planted in them in the same way before proceeding to other crops. With all crops ask if there are any other crops planted in the field, and list up to two more for each field and record the area they occupy. For example if the main crop covers an entire field of one feddan, and another crop is inter-planted over half of the field, the area of the first would be one feddan and the area of the second would be ½ feddan. If it is intercropped over the entire field, it would have an area of one feddan also. Do not make adjustments for intercropping density, apart from the area over which a crop is spread.

When you finish listing tree crops go on to vegetables and field crops. In each field begin with the dominant crop and give it a planting method code of 1 if it is sole cropped, and 3 if it is intercropped, indicating it is intercropped, but not with fruit trees. Then proceed to list up to two more most important crops in the field and give each one a planting method code of 3 as well.

When you finish listing crops grown during the last (Summer) season, list those grown during the Nili and winter seasons preceding, being sure to always ask if there were any other crops in the field, and listing up

to a total of three crops for any one field. Continue numbering the fields consecutively, even if the same field was planted with the same crop in the prior season. When you finish with the listing you will have the cropping pattern for the entire year.

After you finish listing the crops go back and get the total production for each crop and each season as reported by the farmer or manager. Enter the irrigation system and water source; usually it will be the same for all crops. If it is not, use the appropriate code for each field that differs. For fruit trees enter the average age of the trees on the field. For grapes only, enter the training system. Training system will be blank for all other crops.

Power Inputs and Costs: In selecting fields on which to collect cost data, use the guidelines provided to you by the DGAS. Complete this form only for pure cropped fields. If a farmer has more than one field of the same crop and does the field operations at the same time, combine the fields and record the inputs for all fields and record production for all of the fields on the marketing form. If one crop is pure and the other is intercropped, take only the pure cropped field and help the farmer allocate the inputs so that all forms includes only the share for this crop. If the farmer gives you average costs per feddan, instead of for the entire field, record his answers but note on the Cropping Pattern form under COP (cost of production) data code that inputs are for one feddan only (code 1). If the inputs are for the entire field, enter code 2. If the inputs concern more than one field of the same crop, enter a 3 on each line of each field that is included. There should be an entry in this column only for those fields for which you are getting input-output data.

For family labor do not record any days of labor if the farmer gives only a summary cost figure including the value he places on family labor. Add this number to the total cost column for hired labor and put 888 under man days. For hired labor record whatever is easiest for the farmer. If counting days is easier for him, use total days for each type of labor and enter the rate paid for each type. If he offers only the total cost of hired labor enter only the total cost. If he does this, however, make sure he is not also including family labor in the total cost. If he is, erase or cross out the family labor inputs so we know not to count them again. The 888 code under male family labor will indicate to us that the total for hired labor includes family labor, in which case it would be permissible to have entries under both man days and total hired labor; otherwise, only one entry would be permitted: days or total hired labor.

For labor activities, total all of the labor for each type of activity into a single entry. Note that there are separate forms for tree crops, vegetables and field crops. Be sure to write the field and crop to which the data pertain on the top of the form. Also, record the numeric codes for the governorate, district, village and farmer on each page in case the pages become separated.

Costs of Material Inputs: Record the crop and field concerned on the material inputs forms also. Be careful to record fertilizer by type so we can calculate the amount of nutrients applied. For NPK fertilizers ask the farmer if he knows the composition or can show you a bag so you can read it yourself. Record the composition on the form next to N, P and K respectively, and leave the code blank. Do the same for other

chemical fertilizer such as foliar or hydroponic fertilizer. We will code these inputs later. This lets us use a separate code for each different type of fertilizer so we can derive the amount of nutrients supplied at a later time.

Electricity and fuel is to be the total operating charges/costs for just the field for which you are gathering input-output data, if possible (code 25). If the farmer irrigated more than one crop with that cost and cannot allocate a proportionate share to this crop, use code 26. Do not get fixed charges such as pump acquisition, installation or major repairs; we will estimate these from other sources of data. For all inputs record the number of units (quantity), the unit of measure (unit), and the cost per unit, or the total cost for the input. If you have total cost you do not need to enter the unit and the number of units except for fertilizer if you can. Add any other inputs not listed on the form at the bottom and take as many notes as you can so we can sort out later how to handle it. We will code all such inputs later, leave the codes blank for now.

Include on this form permanent labor that should be allocated across all farm activities.

Marketing Channels: On the top of the form record the crop and field to which the data pertain, and the total production of the crop as recorded on the cropping pattern form on the first page. Use a separate form for each crop for which you get input-output data.

Record marketing channels for both the main product and any by-product that has a market value. Quantity refers to the number of units and code refers to the measure code for the unit. You do not need to calculate the value if you have the components; the computer will do that. But you do need the quantity of the main product so you can compare how much of the total production you have accounted for with all marketing channels. Try to account for at least 90% of production from the activity. If the farmer sold his crop as kilalah, see if he can estimate the amount of production the buyer received. Otherwise, enter only the total value received for the crop by the farmer.

Direct export includes only quantities exported directly by this farmer, not quantities he sold to an exporter; those should be recorded as sales under contracting, on farm or through the appropriate marketing channel. Direct processing is the same. If sold to a processor it is a sale to a processor (other), not direct processing. If he presses it himself, it is direct processing. In that case record the amount of the crop he processed, not the amount of the processed product he obtained. If the farmer consumed the crop himself record the amount consumed under home consumption. You do not need to enter a price if the farmer does not know what the quantity used would have sold for in the market Do your best, however, to get from the farmer the local market price for what he consumed, when he consumed it. Include in storage only amounts not yet sold but which the farmer expects to sell. If he expects to consume it, record it as home consumption.

Livestock Holdings: Farm Level: The age/sex codes are mostly self-explanatory. Note that a heifer is

defined as a female who has not yet given birth; it includes females who are pregnant for the first time. Males over two years old should be divided into those being fattened and those being held for breeding purposes. If a farmer is uncertain about the age try to get him to guess.

Draft cattle includes both male and female cattle used for draft purposes. They can be under two years, but are usually over. Most of the time draft cattle will be oxen. Record the number of cattle used for draft purposes in the last column. They should also be recorded in the first or second column under cattle.

Poultry Production: Record both the number of poultry houses and the number of poultry in this table. Houses are usually 3,000 or 5,000 birds, but if the farmer has a different size, record it under other and note the average size of house he uses. Non-working means the house is not now waiting for a new flock, it is completely out of production for the time being.

Pullets are immature laying birds, usually under six months of age. Farmers can report either the number of eggs per hen or the total number of eggs produced in the last 12 months. Some farmers may not know the number of eggs per hen in the last year, but will know the number of eggs per hen over its laying life. In that case make a note at the bottom of the questionnaire with this information and leave the average eggs per hen per year and total eggs produced blank. That will tell us to check the questionnaire and create a new code.

Total batch capacity under meat production means what a farmer could house at one time if he chose to do so. His actual bird population may be much lower than his rated capacity.

Meat, Milk, Wool & Manure Production: The calving interval in the amount of time, in months, between calves. It is different for each cow, so we want the farmer to give us the average for his entire herd. Lactation duration is the number of months a cow is in milk production. If we have the amount a cow produces per day at its highest level of production, usually in the first month after calving, and in the last month of its lactation when it is at its lowest, we can calculate total milk production over the entire lactation with a high degree of accuracy. The enumerator does not need to do this calculation. If the farmer knows his average total per lactation, use that number. If not, get the highest and lowest, on average. Also, if he knows total production for the last 12 months, use that.

For manure combine manure from all sources. Record total sales, if any, and the number of units produced if a farmer knows. Sales are more important than production. If a farmer doesn't know his production we can calculate it based on herd size and composition.

ANNEX G: PROPOSED STRUCTURE OF EXCEL DATABASE NEW LANDS AREAS

Table G1-1: Proposed Database for Cultivated Area for Different Types of Farms - East Delta

Area Code	Area Name	Graduates		Bneficiaries		S. Investors		B. Investors		Squatters		Others		Total	
		No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
Qalubia Governorate															
1	El-Gabal El-Asfar														
2	Anshas														
	Other														
Total Qalubia															
Ismaelia Governorate															
3	El-Mullak														
4	El-Manaief&Coops														
12	El-Shabab														
20	El-Khattarah														
	Other														
Total Ismaelia															
Suez Governorate															
5	Suez														
6	El-Ferdan														
25	West of Suez														
	Other														
Total Suez															
Sharkia Governorate															
7	Bahr El-Baqar														
8	El-Qasabi														
9	Abou El-Akhdar														
10	El-Serw														
11	El-Salhia														
14	Husseneia														
19	El-Salhia Desert														
21	Ramsis Company														
23	El-Adliah														
	Other														
Total Sharkia															

Damietta Governorate															
13	Faraskour														
32	ElSannania														
	Other														
Total Damietta															
Port Said Governorate															
15	South Port Saeed														
16	Sahl Port Saeed														
17	Berket Um El-Reesh														
18	Coop Bilbis Road														
18	Bain El-Matareen														
22	El-Matariah/salam														
	Other														
Total Port Said															
Dakahlia Governorate															
24	Masraf El-Atwa														
30	ElZawiah/ElMansour														
31	Shalma														
	Other														
Total Dakahlia															
Sub-Total East Delta															

Table G1-2: Proposed Database for Cultivated Area for Different Types of Farms - Middle Delta

Area Code	Area Name	Graduates		Bneficiaries		S. Investors		B. Investors		Squatters		Others		Total	
		No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
Kafr El-Sheikh Governorate															
27	El-Satamouni														
28	Hafeer Shehab el-Deen														
29	Elhamoul / Nabarouh														
33	Elkhashaa / Balteem														
34	Abou Madi														
35	ElBorolloss														
36	Elkome ElAkhdar														
37	North Metoubass														
	Other														
Total Kafr El-Sheikh															
Menoufia Governorate															
57	El-khatatbah														
	Other														
Total Menoufia															
Sub-Total Middle Delta															

Table G1-3: Proposed Database for Cultivated Area for Different Types of Farms - West Delta

Area Code	Area Name	Graduates		Bneficiaries		S. Investors		B. Investors		Squatters		Others		Total	
		No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
Beheirah Governorate															
37	ElBouseily														
38	Edko														
60	Wadi El-Faregh														
61	North Tahrir														
62	Wadi El-Natroun														
	Other														
Total Beheirah															
Alexandria Governorate															
39	Abis														
40	Elhagir														
59	El-Rowaysat														
	Other														
Total Alexandria															
Matrouh Governorate															
50	North West Coast														
	Other														
Total Matrouh															

El-Nubaria Region															
41	El-Nahda														
42	Janakleese/North Sector														
43	Mechanized Farm														
44	West Nubariah														
45	Fermesh														
46	El-Tahaddi														
47	Al-Intlak														
48	El-Fath														
48	El-Rowwad														
51	El-Falouga														
52	Around El-Nasr Canal														
53	Bangar El-Sokker														
54	El-Bustan 1 & 2														
54	Bustan Extension														
55	El-Takhasosia														
56	Cairo/Alex Desert Rd.														
63	Maryout & Extensions														
	Other														
Total El-Nubaria															
Sub-Total West Delta															

Table G1-4: Proposed Database for Cultivated Area for Different Types of Farms - Middle Egypt

Area Code	Area Name	Graduates		Bneficiaries		S. Investors		B. Investors		Squatters		Others		Total	
		No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
Giza Governorate															
64	Werdan														
65	El-Mansouriah														
72	El-Saff & Ghammazah														
96	Baharia Oasis														
	Other														
Total Giza															
Fayoum Governorate															
66	Kome Ushim														
67	El-Fayoum														
68	Koutah														
75	East Wahbi Sea														
75	Intra Wahbi Sea														
A	Intra Wassif Sea														
B	Wadi El-Rayan														
	Other														
Total Fayoum															
Bani Sweif Governorate															
73	West Fashn/Samalout														
74	West Bani Suef														
	Other														
Total Bani Sweif															
Sub-Total Middle Egypt															

Table G1-5: Proposed Database for Cultivated Area for Different Types of Farms - Upper Egypt

Area Code	Area Name	Graduates		Bneficiaries		S. Investors		B. Investors		Squatters		Others		Total	
		No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
Minya Governorate															
69	Mazourah/Sakoulah														
70	El-Kamadeer & Tourfah														
76	El-Minya														
	Other														
Total Minya															
Assyout Governorate															
84	East Assyout														
	Other														
Total Assyout															
Sohag Governorate															
71	West Tahta														
85	East Touk Sons														
	Other														
Total Sohag															

Qena Governorate															
78	West Esna														
79	Elredisa/Wadi Abadi														
82	Wadi Khrest/Shait														
83	El-Marashdah														
86	West Girga														
87	Wadi El-Lakitah														
	Other														
Total Qena															
Aswan Governorate															
80	Kome Umbo														
81	Around Nasser Lake														
88	Wadi El-Saaidah														
	Other														
Total Aswan															
Sub-Total Upper Egypt															

Table G1-6: Proposed Database for Cultivated Area for Different Types of Farms - New Valley

Area Code	Area Name	Graduates		Bneficiaries		S. Investors		B. Investors		Squatters		Others		Total	
		No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
90	El-Frafrah														
92	West Mawhoub														
93	Baris														
94	Sahl El-Zayat														
95	Oweinat/Dakhla/Kharga														
116	Sahl Frarin														
	Other														
Sub-Total New Valley															

Table G1-7: Proposed Database for Cultivated Area for Different Types of Farms - Saini

Area Code	Area Name	Graduates		Bneficiaries		S. Investors		B. Investors		Squatters		Others		Total	
		No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
97	East Bitter Lakes														
98	El-Areesh														
98	North East Coast														
99	Meet Abou El-Kome														
100	El-Shabab Farms														
101	South Saini														
	Other														
Sub-Total Saini															
Grand Total															